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ABSTRACT

This report presents and analyzes data on standing height and on weight of children aged 6 through 11 years in the United States, India, and the United Arab Republic. Data for all three countries come from representative national samples and present the first opportunity to compare data from several countries that are broadly representative of the respective populations of children. The present data provide basic norms which have long been needed. The variability of height and weight with age and with sex is very similar in each of the three countries. The heights and weights of children in the United Arab Republic fell between those of the other two countries, but somewhat closer to those for India. Heights of children have increased during the past half century. The report presents information on the samples in the three countries and discusses the sampling error and measurement errors in the data. (Author/AJ)

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ANALYTICAL STUDIES

Height and Weight of Children in the United States, India, and the United Arab Republic

Presentation and analysis of comparative data on standard height and weight of children aged 6 through 11 years.

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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CONTENTS

	Page
Introduction	1
Description of the Data	2
Children of the United States	2
General	2
Sample Design	2
Plan of Survey Operation	3
Measurement Process	3
Children of India	5
General	5
Sample Design	5
Plan of Survey Operation	5
Measurement Process	6
Children of the United Arab Republic (Egypt)	6
General	6
Plan of Survey Operation	7
Statement of Basic Findings	8
Children of the United States	8
Mean Height and Weight by Sex and Age	8
Standard Deviations of Height and Weight Data	9
Percent Distributions	9
Selected Percentiles of Height and Weight Distributions	12
Standard Errors of the Means	12
Children of India	12
Mean Height and Weight by Sex and Age	12
Standard Deviations of Height and Weight Data	13
Percent Distributions	15
Selected Percentiles of Height and Weight Distributions	16
Children of the United Arab Republic (Egypt)	16
Mean Height and Weight by Sex and Age	16
Standard Deviations of Height and Weight Data	19
Percent Distribution	19
Selected Percentiles of Height and Weight Distributions	19
Relationship Between Height and Weight	20
Children of the United States	20
Children of India	22
Children of the United Arab Republic (Egypt)	23
Comparison of Data for the Three Countries	25
Absolute Values and Their Distributions	25
Interrelationship Between Height, Weight, Age, and Sex	26
References	27
Detailed Tables	28

THIS REPORT presents and analyzes data on standing height and on weight of children aged 6 through 11 years in the United States, India, and the United Arab Republic (Egypt). Data for all three countries come from representative national samples and present the first opportunity to compare data from several countries that are broadly representative of the respective populations of children. The present data provide basic norms which have long been needed.

The variability of height and weight with age and with sex is very similar in each of the three countries. The level of the values, however, is clearly different in each of the three. The means and the percentiles for both height and weight are markedly higher for children of the United States than for children of the other two countries. Indian children had the lowest mean values, and the heights and weights of children of the United Arab Republic fell between those of the other two countries, but somewhat closer to those for India.

Heights of children have increased during the past half century. While no truly comparable national data exist for earlier periods, it is of interest that the available but limited data on height of children of the United States around the turn of the century are slightly lower than the current data for children of Egypt and are slightly higher than those for children of India.

The report presents information on the samples in the three countries and discusses the sampling error and measurement errors in the data.

HEIGHT AND WEIGHT OF CHILDREN IN THE UNITED STATES, INDIA, AND THE UNITED ARAB REPUBLIC

Arthur J. McDowell, Anand D. Taskar, Ph.D., and Ahmed E. Sarhan, Ph.D.[a]

INTRODUCTION

Measurements of height and weight are of interest from various points of view. Aside from their usefulness to persons concerned with human engineering problems such as, say, seat design, they are related to health. This is particularly true when the measurements are for children, since they reflect the process of growth and development and may be affected by nutritional factors.

The National Center for Health Statistics has as one of its major programs the Health Examination Survey program. This program is carried out as a series of separate surveys concerned with the direct examination, testing, and measuring (including body measurements) of probability samples of specific segments of the U.S. population to obtain a wide range of health related data. The Center also sponsors a number of projects in various parts of the world as part of the Special International Research Programs authorized by Public Law 480 to utilize foreign currency in scientific research (Special Foreign Credit Programs funded research). Two of the projects involved the tabulation and analysis of large sets of data which include some body measurements of children of India and Egypt. Some of the same kinds of data available from these two programs have been collected in the Health Examination Survey for children of the United States.

The present report gives data on standing height and on weight of children aged 6 through 11 years for the United States, India, and the United Arab Republic (Egypt). Data are considered separately by sex and individual years of age. Means are shown along with their standard deviations. Percent distributions and selected percentiles for height and weight distributions are also shown. Percentiles for mean weight are cross-classified by grouped intervals of height to the extent that the data permit.

In presenting these data, their limitations are acknowledged. Body measurements other than height and weight—perhaps particularly certain skinfold thicknesses and girths—are also useful in making assessments related to such aspects of health as obesity or malnutrition. Considerable other data, including body build information, dietary intake records, clinical evaluations, and certain laboratory test results, would be important elements in any complete assessment of the nutritional state of a population. Moreover, there are restrictions on the kinds of uses in studies of growth and development that can be made of height-weight data collected through a cross-sectional survey, as distinguished from longitudinal data when the interest is primarily upon the velocity of growth and particularly upon the variability in that velocity.[1]

The present data are cross-sectional. Moreover, national averages for each of the countries involved conceal the differences that exist within

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each country among various subgroups (regional, ethnic, racial, religious). Other reports have been or will be prepared examining height and weight data for each country in more detail with respect to some of these variables; none of them are treated here.

Despite all the foregoing limitations, these data are important in their own right. This is the first time that any complete national data on the height and weight of children aged 6 through 11 years have been available for any of these three countries. In each country the data have been collected with considerable concern for standardization of measurement techniques and uniformity of recording procedures. In each country thousands of children were included in the study, and they were selected to constitute representative samples of all children 6 through 11 years. The data for each country have been presented in a standard manner and show not only the average values but the dispersion around the averages. An effort has been made to make some evaluation of the sampling error and the measurement error that may persist in the data. Measurements of height and weight continue to be important indexes of the progress of a child through his stages of growth and development and of a nation's progress in the field of health. The present data provide basic norms which have been long needed.

DESCRIPTION OF THE DATA

CHILDREN OF THE UNITED STATES

General

Data for the United States were obtained from one of the programs of the Health Examination Survey. This program involved, along with body measurements, a variety of tests and procedures, including medical, dental, and psychological examinations. Subjects were a probability sample of all noninstitutionalized children aged 6 through 11 years. From July 1963 to December 1965, the survey staff completed examinations on 7,119 children, 96 percent of the 7,417 sample children. A detailed description of the sampling process, the operation of the program, and the response results has been published.[2] Some of these matters need to be described briefly to assist in understanding and evaluating the data.

Sample Design

The National Center for Health Statistics set specifications for the sample of U.S. children and developed the overall design. The steps of drawing the sample were carried out jointly with the U.S. Bureau of the Census under a contract arrangement. The starting points were the decennial census lists and the nearly 2,000 primary sampling units (PSU's) into which the entire United States is divided. These PSU's were grouped into 40 superstrata (a combining of an earlier grouping into a larger number of strata). In this process the areas were classified by broad geographic region, by population density classes (degree of urbanization), and by rate of change of population between two decennial censuses. Through a process of controlled selection, specified numbers of clusters of households, called segments, were selected. Interviewers visited each household in the selected segments to obtain data on household composition that could be used in the final random selection of sample children.

The foregoing description of the sample design is somewhat oversimplified. For example, provisions were made to supplement the original data, taking into account persons who had moved into the area subsequent to the census. The strata were selected so as to be roughly equal in population, so that, with approximately the same number of children coming from each stratum, the total sample would be essentially self-weighting. The estimation process developed for use with the sample design, however, included an adjustment for nonresponse (even though a high response rate was achieved) and also included poststratification ratio adjustments. These insured that the weighted totals would equal the age, color, and sex distributions of the corresponding U.S. population figures derived independ-

ently by the Bureau of the Census for the survey. It seems reasonable to assume that the sample, although relatively small, is representative of the U.S. population of noninstitutionalized children aged 6 through 11 years.

Plan of Survey Operation

Data on U.S. children were collected in the 40 different locations chosen in the sample design of the Health Examination Survey. However, each area had the same physical setting for the entire examination, including the measurement process for height and weight. Specially designed mobile examination centers, consisting of several tractor-drawn trailers, were moved into each of the areas. Sample children were brought into the center at scheduled times throughout the day. The clothing worn during the examination was a standard uniform provided by the survey, consisting of gym-type shorts, a standard shirt or shirtwaist, socks, and a robe. The robe was removed during the weighing process.

Data on U.S. children were collected during the period July 1963-December 1965. The basic source document was the household questionnaire, which provided considerable information about each potential sample child and was used in the final stages of sample selection. Information obtained included the age and birthplace of the child. The latter was used to request a copy of the birth certificate from the appropriate registrar's office (State or city).

The survey operation made every effort to insure complete standardization of the measurement process. (See section on Measurement Process.) However, because measurements were made at various times throughout the day at each location and in summer in some areas and in winter in others, height and weight measurements were not standardized with regard to diurnal and seasonal variation. Weights vary somewhat between winter and summer and differ slightly depending on recency of food and water intake.

In any study which focuses on the growth of children, it is important that the age of each child be correctly recorded. Age data for children of the United States are based on birth certificates. Age is determined by the difference between date of interview and date of birth as shown on the birth certificate and is used in the present analysis. Birth certificates were obtained for more than 95 percent of the examined sample children. For the remaining children, age was used as stated by the parent.

Measurement Process

Control of the measurement process so as to minimize nonsampling error (or measurement error) was a matter to which considerable effort was directed. This included steps related to the accuracy of measuring equipment, to the training and retraining of examining personnel, to the procedures established for the measurement process and the fidelity with which they are carried out, and to the minimizing of recording or transcribing error.

Weight was recorded using a highly accurate, self-balancing, automatic printing set of scales. The examinee stood on the scales, wearing only the standard examining uniform, less robe. The "Body Measurement" page of the examinee's case record was inserted in the slot at the front of the scale, and the survey technician pressed a button which recorded the weight directly onto the record form. Thus, the possibility of an error in the first step of recording the weight on the record form was avoided. The later transcription of the recorded weight in the data preparation and processing operation was susceptible to and was subjected to sample quality control verification. Weights were recorded to the nearest 0.5 pounds, and this was transformed within the computer into kilograms (and decimals thereof) to the nearest gram.

For measuring standing height, a special device involving a horizontal platform on which the examinee stood and an attached vertical bar on which was fastened a moveable horizontal arm was used. A camera capable of producing a finished print in a matter of seconds was attached to the moveable arm. The examinee, wearing the standard uniform, including socks but without shoes, was positioned on the platform with his back and heels against the upright bar of the height scale. He was then urged to stand erect ("Stand up straight" or "Stand up tall"). With feet together and head in an approximation of the

Frankfort plane ("Look straight ahead"), the moveable arm was lowered to fit snugly against the top of the examinee's head. An adhesive label bearing the examinee's case number was fastened to the vertical bar at a point where the camera focus included both it and the pointer arrow which designated the height. The technician pressed the camera shutter button and photographed the scale reading and case number. The finished print was removed from the camera seconds later and was made a part of the survey record of the examination. Again with this procedure, the possibility of an error in the first step of recording was avoided. The later transcription of the photographed scale reading in the data preparation and processing operation was subjected to sample verification. Height was recorded to the nearest millimeter.

Considerable effort was directed to insuring that the prescribed procedures were followed in making the various body measurements, including standing height and weight. These were always made by designated members of the survey team. The several technicians who took X-rays also did audiometric testing and carried out various parts of the examination. During the 3 years of the survey, there was no personnel turnover in the technician category, and the total number of different individuals who did the examining was only four. At any single time there were two technicians in each of the two Mobile Examination Centers which operated concurrently in different locations. All of these technicians were trained by and were under the technical supervision of the medical advisors to the Health Examination Survey. Written manuals of procedure spelled out the precise way in which the measurement process was to be carried out, and the medical advisor visited the Mobile Examination Center periodically to observe the process. At each new location, or approximately each month, the first day of operations was devoted to retraining. No sample children were seen on that day, but a number of examinations on nonsample children of the same age were made. During the training operation each of the two technicians would measure the same subject and compare their results to increase standardization of procedures. With respect to some of the body measurements, this and other replication activities were an important part of the effort to control measurement error. With respect to standing height and weight, the measures taken to mechanize the recording were regarded as sufficient to obtain this same end.

At every new location certain established procedures to recalibrate the measuring devices were carried out. A set of standard weights was used to verify the accuracy of the weight scales. Combinations of the separate weights were placed on the scales, and recording accuracy was verified at 25-pound intervals from 0 to 150 pounds. Whenever any discrepancy was detected, the necessary adjustment was made. At the beginning and end of each stand a systematic check was also made of the equipment for measuring height. It is believed that these checking and calibration procedures safeguarded the survey against the introduction of measurement error through equipment malfunction.

It was noted that weights were all recorded with examinees wearing the standard survey uniforms. While four different sizes were used, they varied in weight from only .11 to .30 kilograms. The amount of difference from nude weights, even though always in one direction, is regarded as negligible in data where the precision of the original measurement is only to the nearest .23 kilograms. The effect of the socks worn for the measurement of height is likewise negligible.

While no direct quantitative assessment can be given of the effect of examiner-related measurement error on the height data, there are some relevant data from another Health Examination Survey using similar procedures. The data suggest that the median absolute interexaminer and intraexaminer differences found in the replication of height measurements of the same subjects amounted to only about 3 or 4 millimeters. In the analysis of the data, heights have generally been considered in 5-centimeter groups. Since the variability in the measurements due to examiner error seems equally likely to be in either direction and since the magnitude of that error is small relative to the measurement itself and to the range included in the grouped frequencies, it is believed that the effect on the resultant means, percentiles, and the like can be disregarded.

CHILDREN OF INDIA

General

Data on children of India are taken from a larger cross-sectional survey carried out in India by the Indian Council on Medical Research. The study, "Growth and Physical Development of Indian Children," was planned and executed, insofar as data collection is concerned, during the period 1956-65. The principal purpose of the study was to establish standards of reference on growth and development of Indian children. The Indian Council on Medical Research appointed a Working Party to evolve uniform procedures for the conduct of studies and the collection, analysis, tabulation, and interpretation of the data obtained. The survey was made on a country-wide basis and covered the entire age range from birth to 21 years of age. The National Center for Health Statistics assisted in the process of tabulating and analyzing the collected data. This report presents only the data on standing height and weight of children aged 6 through 11 years.

Sample Design

Data were collected from a representative sample covering all socioeconomic groups and religions and as many areas of the country as possible. Uniform instructions were prepared to govern the procedures of sample selection in the various parts of the country. The original sample proportion was set at one in a thousand. The size of the sample was fixed at 200,000 children. Of the total sample children, about 44,000 children aged 6 through 11 were examined. Slightly more than half were boys, and there were approximately the same number of children at each single year of age.

The sample was stratified on a rural-urban axis. Three-eighths of the total sample were from rural areas, and the balance was from urban areas. A stratified random sampling design was adopted to select the rural sample. Further stratification was introduced for the urban areas, so that specified numbers of the sample were drawn from groups of towns or cities of various sizes. An attempt was made to insure that the nonschool population was properly represented along with the in-school population. Consideration was also given to appropriate representation from various socioeconomic groups in the population. Thus, for example, schools were stratified according to the different socioeconomic groups which they tend to serve, and the required sample was drawn after the stratification, taking into account the relative numbers of persons in the different strata.

It was decided to limit the sample to persons who were residents of the area, in the sense that they had spent the major part of their life there. In addition the sample excluded certain children classed as abnormal. The instructions for this exclusion read as follows:

"Only those children showing the following signs or symptoms should be eliminated from the study:

(a) Those, who have been bedridden for more than 15 days, during the six months preceding the time of examination and those who suffered from any ailment in the preceding one month.

(b) Those with physical deformities or clinical evidence of endocrine dysfunction.

(c) Those with any chronic systemic diseases of the organs as listed in the *pro forma*, and

(d) Those showing the following signs of mainutrition, e.g., Bitot's spots, keratomalacia, glossitis or angular stomatitis, marked anaemia and stigmata of past rickets.

One need not eliminate children with chronic conjunctivitis, trachoma, history of tonsilitis, skin infections, etc., but such conditions, when observed may be noted clearly under the remarks column before the measurements are obtained."[3]

Plan of Survey Operation

The Indian Medical Research Council established seven different units in different parts of

the country to carry out the survey. The units were located at specified universities, medical colleges, and laboratories. Ten survey teams performed the examinations in the seven areas, each team examining approximately 20,000 persons for the total sample. Each team had one medical officer for a clinical appraisal of the child, one anthropologist for obtaining the measurements, one statistical assistant to help in the selection of the sample, one social worker, and an attendant.

The social worker was to ascertain the correct age of the child and to assess the socioeconomic status and living conditions. It was recognized that assessment of correct age would be difficult although it was extremely important to the usefulness of the data. The Working Party recommended that, through tactful interview with parents, attempts be made to check on the age of the children in a subsample of at least 5 to 10 percent of the examinees. For this check reliance should be placed only on "documentary evidence like authentic home records, horoscopes, baptismal certificates, birth registers maintained at hospitals or municipal or local board offices, etc." Reliance was not to be placed on school records or on oral statements for the correct age.

The sample design as developed by the Working Party has already been described. The plan of operation called for the statistician or statistical assistant attached to each of the teams to actually execute the design and select the sample. He was instructed to "see that the sample is not affected by conscious or unconscious bias" and to "make it as representative as possible of the population" from which it was drawn.

Verification of age was actually obtained for more than one-fourth of the cases in the 6-11 age range. Separate analysis of these "age-verified" cases showed that the means for both height and weight were almost identical with those for the total sample, for both males and females, and for each year of age. It is interesting to note that the standard deviations of these means for the age-verified children tended to be somewhat lower than for the total sample.

Measurement Process

The importance of standardization in the measurement process was clearly recognized. Persons who were to make the measurements were trained together at central points, and the training included replicate measurements to assess the range of personal error of each worker. From time to time instruments used were checked for accuracy. Measurements were made with minimal clothing.

For the measurement of standing height the child was made to stand (with heels together and without shoes) so that the shoulders, buttocks, and heels touched the vertical upright portion of the scales. The individual looked straight forward so that the line drawn from the tragus to the inferior orbital margin was in a plane parallel with the floor. At the time of measuring he was asked to take a deep breath and make himself as tall as possible without raising his heels. The height was recorded when the anthropometer beam was brought down firmly on the vertex. When necessary, combs, ribbons, clasps, or other impediments were removed from girls' hair prior to this procedure.

For the measurement of weight a beam type scale was used. Its accuracy was checked daily by the use of standard weights. Younger children of both sexes and boys of all ages were weighed in the minimum of clothing possible, and the weights may be taken to approximate nude weights. In the case of older girls, four or five of the most common types and sizes of dresses were weighed in order to determine standard adjustment factors. An appropriate allowance was made for the clothing, depending upon the kind worn. Thus, these weights as recorded may also be taken to approximate nude weights.

CHILDREN OF THE UNITED ARAB REPUBLIC (EGYPT)

General

Data on children of Egypt are taken from a larger cross-sectional national school health survey carried out in each of the Egyptian

governates in 1962 and 1963. The survey was jointly planned and conducted by the Egyptian Central Statistical Committee and the Ministry of Public Health. It was larger in the sense that it covered the age range from 6 through 18 years. The population surveyed by representative sampling was that of children aged 6-18 who were enrolled in public primary, preparatory, and secondary schools.[4]

One objective of the survey was to provide information on certain school-age health problems such as skin diseases, dental diseases, and urinary and intestinal parasitic infections. Another objective was to provide standards and norms of growth in height and weight. The information was needed not only for school health program planning but for medical and industrial uses as well. Pediatricians and other physicians had been obliged to use European or American standards of growth since data for a national sample of Egyptian children had never been obtained. Two limited studies in Cairo in 1956 and in Alexandria in 1959 indicated that the norms for children of Egypt did differ from those for children of Europe and America, but that there had never been a study on a national representative sample.

The National Center for Health Statistics assisted in tabulating and analyzing the collected data. This report presents only the data on standing height and weight for children aged 6 through 11 years.

Plan of Survey Operation

A survey committee composed of various medical and health specialists was organized in the Ministry of Health and was responsible for the planning and conduct of the survey. The committee supervised the field work, and its members and officials in the Department of School Health and the Department of Statistics (both of the Ministry of Public Health) periodically visited the field teams during the survey. The committee devised the survey forms and the instruction manuals. There was at least one field team in each governate. Each field team was composed of a physician, a dermatologist, an oculist, a dentist, two laboratory technicians, two "health visitors,"[b] attendants, and a driver. Prior to the survey all members of all field teams attended a training course in Cairo and also participated in pretesting the survey form. The teams then visited the chosen schools and examined the sample pupils. They operated under the direct supervision of the Assistant Director for School Health of the Governate Health Administration.

The sample selected was a stratified proportionate random sample of school children drawn from a frame maintained in the Ministry of Education of all primary, preparatory, and secondary public schools in all governates of the UAR. The sample selected included over 100,000 pupils in the age range from 6 through 11 years. The sample was shown to be representative in respect to age, sex, type and place of education, and the rural-urban distribution of the universe in each of the governates. Slightly over one-fifth of the sample was not examined, because of absenteeism on the day of the visit. The high absentee rate has been attributed to causes not mainly medical. The period during which much of the survey was carried out (April-June) coincides with the harvest season, the cotton-leaf worm campaign in the rural areas, and the pre-examination period at the end of the school year. The sample examined is assumed to be fairly representative of the universe from which it was selected. It should be noted that this is a universe of children enrolled in public schools. The exclusion of children attending private schools may be numerically insignificant. There is, however, variation by governate in the proportion of the total child population enrolled in public schools despite compulsory education laws applicable to these ages. In part the variation reflects the differing situations with respect to school capacities for enrollments. It has been estimated that the proportion of children 6 through 11 years enrolled in school may vary by governate from a low of about 80 percent to well over 90 percent. This should be kept in

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[b]The "health visitor" is a paramedical aide who has received some special school training in performing certain unprofessional health related tasks.

mind when relating findings of the school survey to the total population aged 6-11 years.

The age recorded in the survey was obtained from the school records, which showed the age as stated on the birth certificate.

The measurements of height and weight were made by the two "health visitors" under the direct supervision of the physician member of the team. Height was recorded to the nearest centimeter. For the height measurement the pupil stood erect and barefooted. The head marker was kept parallel to the floor and was made to touch the head tightly. The reading was to be rechecked before recording. Weight was taken with the pupil clad only in underwear and barefooted and was recorded, after the "health vistor" rechecked the reading, rounded to the nearest kilogram. The pupil was to have urinated prior to the recording. The height and weight scales used were regularly checked by the field team members to insure accuracy and leveling.

STATEMENT OF BASIC FINDINGS

CHILDREN OF THE UNITED STATES

Mean Height and Weight by Sex and Age

Height.—The mean heights of U.S. children aged 6 through 11 years increased quite regularly by about 4 or 5 percent for both boys and girls at each successive year of age. At ages 6 and 7, boys were on the average only about 1 cm. taller than girls. The means were identical for the two sexes at age 9, and at ages 10 and 11 girls were on the average about 1 or 2 cms. taller than boys.

At age 6 boys had a mean height of 118.6 cms. The mean increased by about 5 or 6 cms. for each single year of age until it reached 145.7 cms. at age 11. Girls at age 6 had a mean height of 117.8 cms.; the mean increased about 6 or 7 cms. for each single year of age until it reached a mean of 147.6 at age 11 (table 1). It is important to remember that these increments are true of the means of groups of children. Individual children vary in their rates of growth, and the limitations of cross-sectional data, already noted, must be recognized in considering year-to-year changes.

It is apparent from the foregoing that the graphs for mean height for this population are very nearly straight lines. The question of the appropriate curve to properly fit human growth data is much more complicated than is seen by examining this limited age group. The subject has been studied intensively most recently by Pineau,[5] who begins with a review of the related work done in many countries and proceeds to demonstrate that the appropriate curve of human growth is formed by joining two S curves. During the short period of

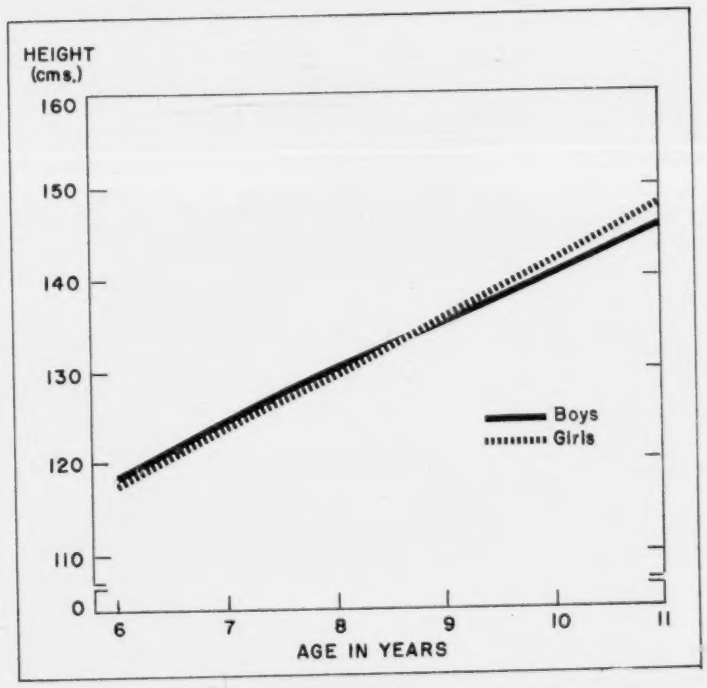

Figure 1. Mean heights of children aged 6 through 11 years, by sex and single year of age: United States, 1963-65.

years from age 6 to 11, however, a period just preceding and partly including the second point of inflection of the combined curve of Pineau, the rate of curvature is very slight and the curve in this segment is roughly linear. Since the presently available data on U.S. children include only a limited portion of the total period of growth and development, no attempt has been made to fit a curve to the data. Figure 1 shows the broken lines (boys and girls) resulting from connecting the means for each year of age.

Weight.—Mean weights by sex and age showed a generally similar pattern, but there were some differences. The mean weights for boys at ages 6 and 7 were only slightly above those for girls (about 0.5 kgs.). The means for weight, as for height, at ages 8 and 9 were intermediate and quite close together. The main difference in the comparison is that at ages 10 and 11 girls had mean weights that exceeded those of boys of similar ages by a relatively greater amount (about 1.5 kgs.)—relative to the advantages of boys aged 6 and 7—than was true for the means of height. Another way of stating the same difference is that the graph of the changes in mean weight of girls is less nearly linear than either the graph for mean weight of boys or the graphs for mean height of both boys and girls (figs. 1 and 2).

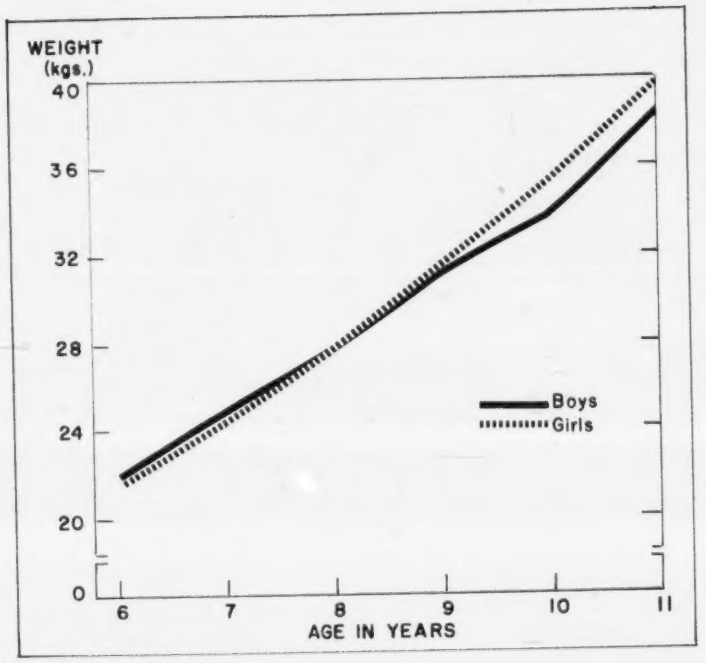

Figure 2. Mean weights of children aged 6 through 11 years, by sex and single year of age: United States, 1963-65.

Standard Deviations of Height and Weight Data

Standard deviations of height ranged from 5.3 cms. to 7.0 for boys. The lowest value was for the 6-year-old boys, and the figures increased regularly throughout the age range. Corresponding values for girls displayed the same pattern of increase with increasing age (from 5.5 cms. at age 6 to 7.8 at age 11), but were slightly higher at every year of age than the standard deviations for boys.

Essentially the same age and sex differences were seen in the standard deviations of weight. Here again, as with the height, the dispersion of the distribution was a little greater for girls than it was for boys. Also, with only one exception, the standard deviations increased as age increased (table 1).

Standard deviations for weight data were much larger relative to the measured weights than were standard deviations for height data relative to the measured heights. The magnitudes of the standard deviations for height were about 4 or 5 percent of the mean values; for weight the standard deviations were from 16 to 23 percent of the means. These figures are, of course, the coefficients of variation. Thus the frequency distributions of the weights are less compact and are spread out more widely.

Percent Distributions

Percent distributions for height and weight are presented by sex and single years of age in tables 2 and 3. The tables show the percent of the total population of specified sex and age that falls within each of the designated height or weight groups, or ranges of measurement.

The general pattern displayed by the height distributions is seen more readily in figure 3. Here it is apparent that the shape of the distributions for each age forms a more or less normal curve pattern. At the older ages in this range, the curves become less peaked, a fact that had already been implied by the increase of the standard deviations with age.

It is apparent from either the graphs or the tables that the modal group of the distribution increased by about one group with each year of increased age. The ranges of the distributions have some overlap for any two of these ages, the degree of overlap decreasing regularly as the two ages are farther apart. Thus, only about 5 percent of the 11-year-old boys were short enough to fall in the range which included essentially all of the 6-year-old boys and over 95 percent of the 7-year-olds.

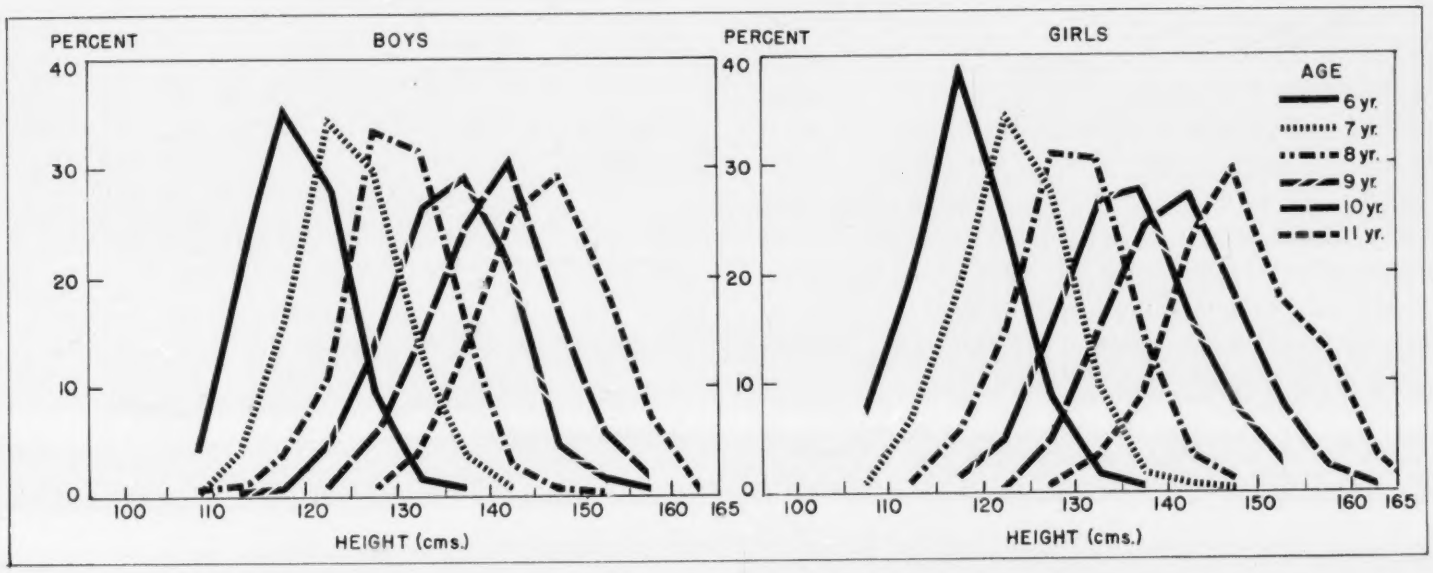

Figure 3. Percent of children aged 6 through 11 years in each specified height group, by sex and single year of age: United States, 1963-65.

(Graphs are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

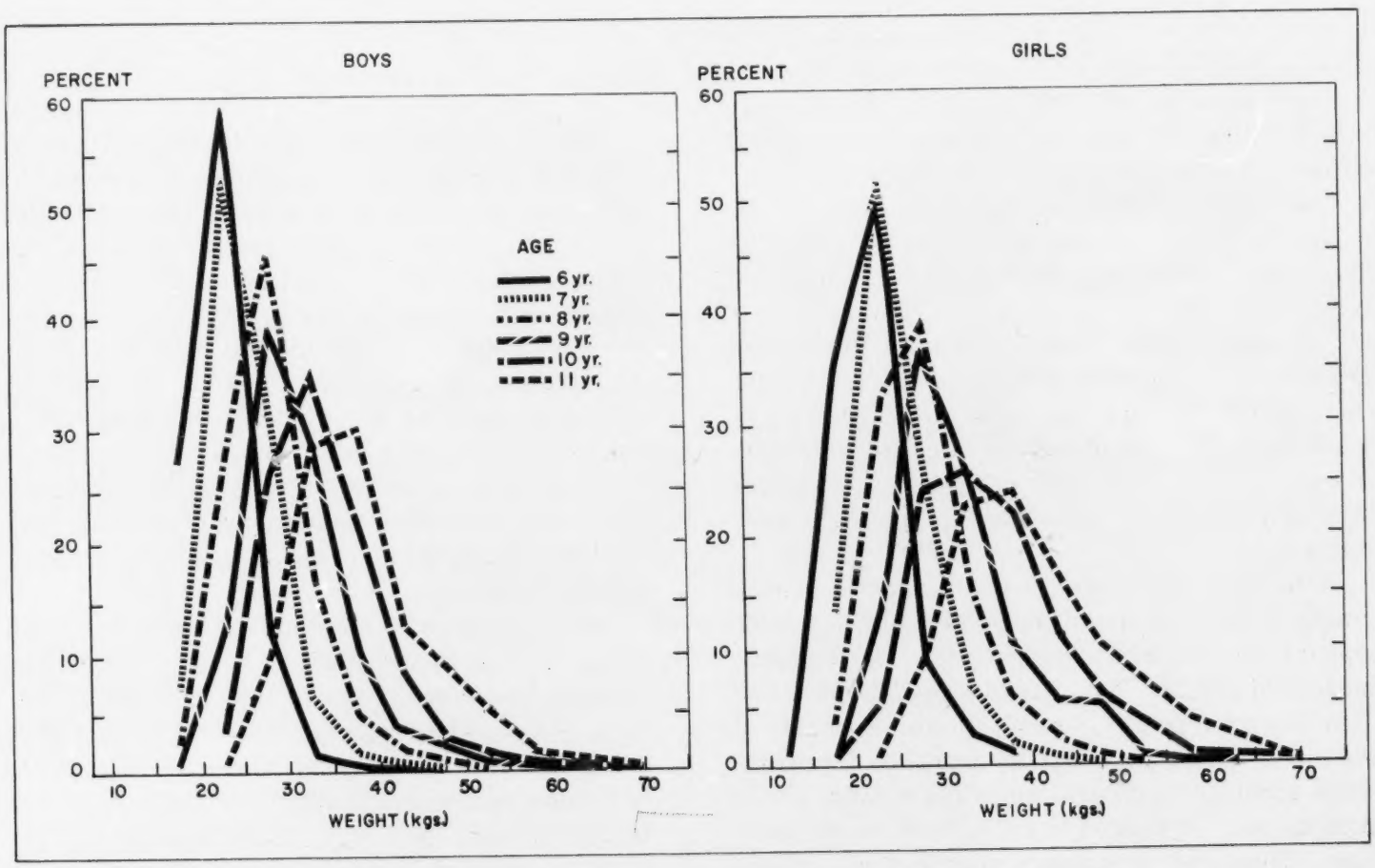

Figure 4. Percent of children aged 6 through 11 years in each specified weight group, by sex and single year of age: United States, 1963-65.

(Graphs are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

As shown in figure 4, distributions of the weights present a picture somewhat different from that for heights. For both boys and girls the distributions show considerable difference between the younger and older portions of the age range. At the upper ages the weight curves were skewed to the right. The curves for ages 6 and 7 were much more peaked and the range more limited relative to the curves for ages 10 and 11. This same relationship was implied by the standard deviations, which increased for height less than one-half from 6 years to 11 years, while the standard deviations for weight were more than doubled over this range.

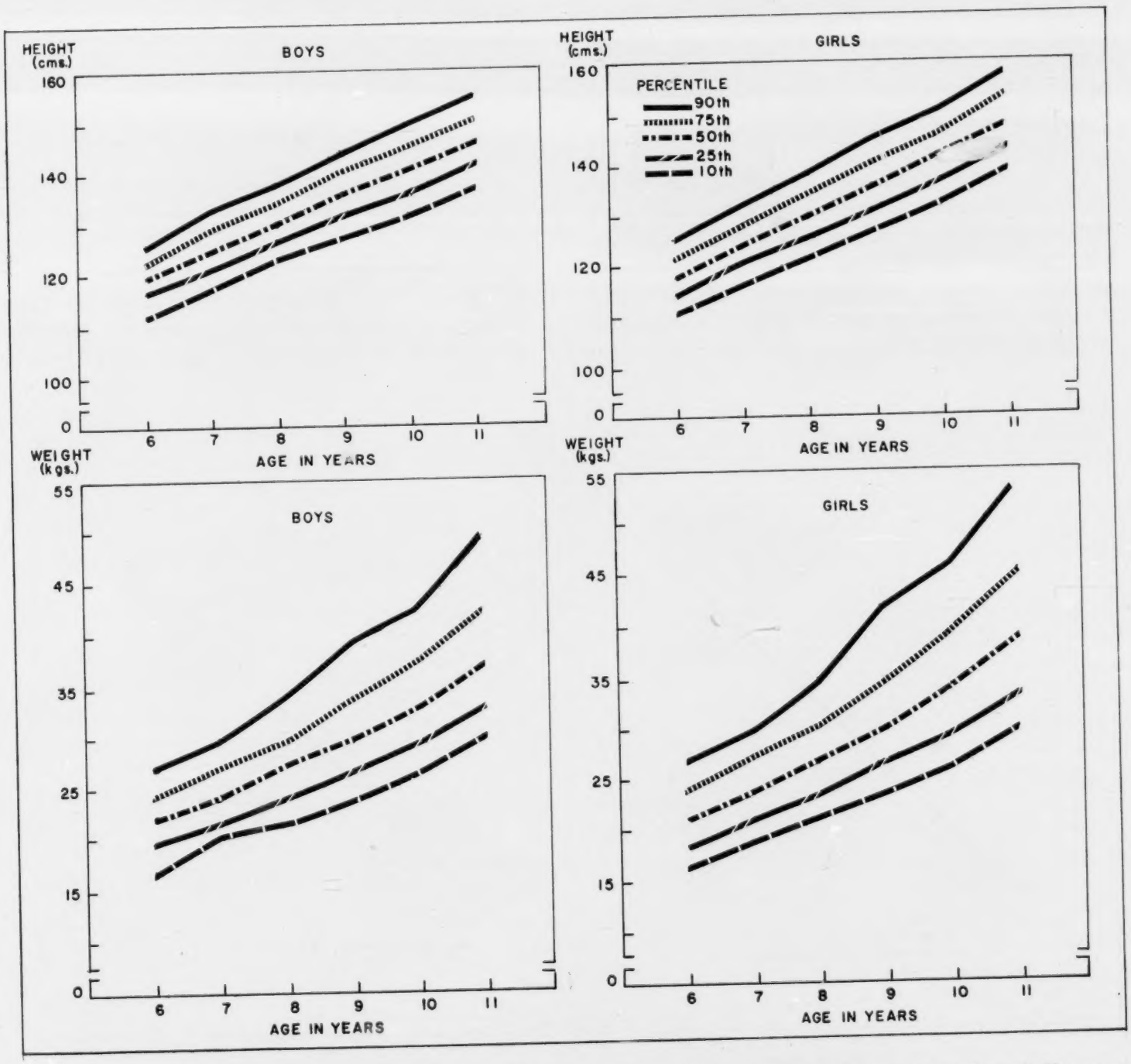

Figure 5. Selected percentiles of the height and the weight distributions of children aged 6 through 11 years, by sex and single year of age: United States, 1963-65.

Selected Percentiles of Height and Weight Distributions

The medians for height of both boys and girls were almost identical with the means. This was true for each single year of age 6 through 11. For weight, however, means and medians were almost the same at age 6, but at the older ages the means were higher—reflecting the fact that more extreme values were above the median than below it. Medians (50th percentile) are shown in figure 5 and table 4, along with the 25th and 75th and the 10th and 90th percentiles.

Standard Errors of the Means

The values presented for height and weight of U.S. children have been obtained through a survey which was based on a probability sample. Because this survey used a complex, multistage, clustered design, the computation of statistical measures such as the standard error of the mean presents certain problems. The method used to determine the variances involves a pseudoreplication technique described elsewhere.[6]

The standard errors of the means for heights ranged, by single year of age, from 0.24 cms. to 0.44 for boys and from 0.18 to 0.33 for girls. For weight the standard errors of the mean fell between 0.15 and 0.43 kgs. for boys and between 0.21 and 0.41 kgs. for girls. These standard errors include some effects of residual measurement error as well as the sampling error in the data. Values are small relative to the measurements.

CHILDREN OF INDIA

Mean Height and Weight by Sex and Age

Height.—The mean height of children of India at age 6 was 108.5 cms. for boys and 107.4 cms. for girls. By age 11 the means were 133.4 and 133.6 cms., respectively (table 5). Height increased in an almost linear fashion for both boys and girls throughout the age range 6-11 years (fig. 6). The equation of the fitted regression line for boys is

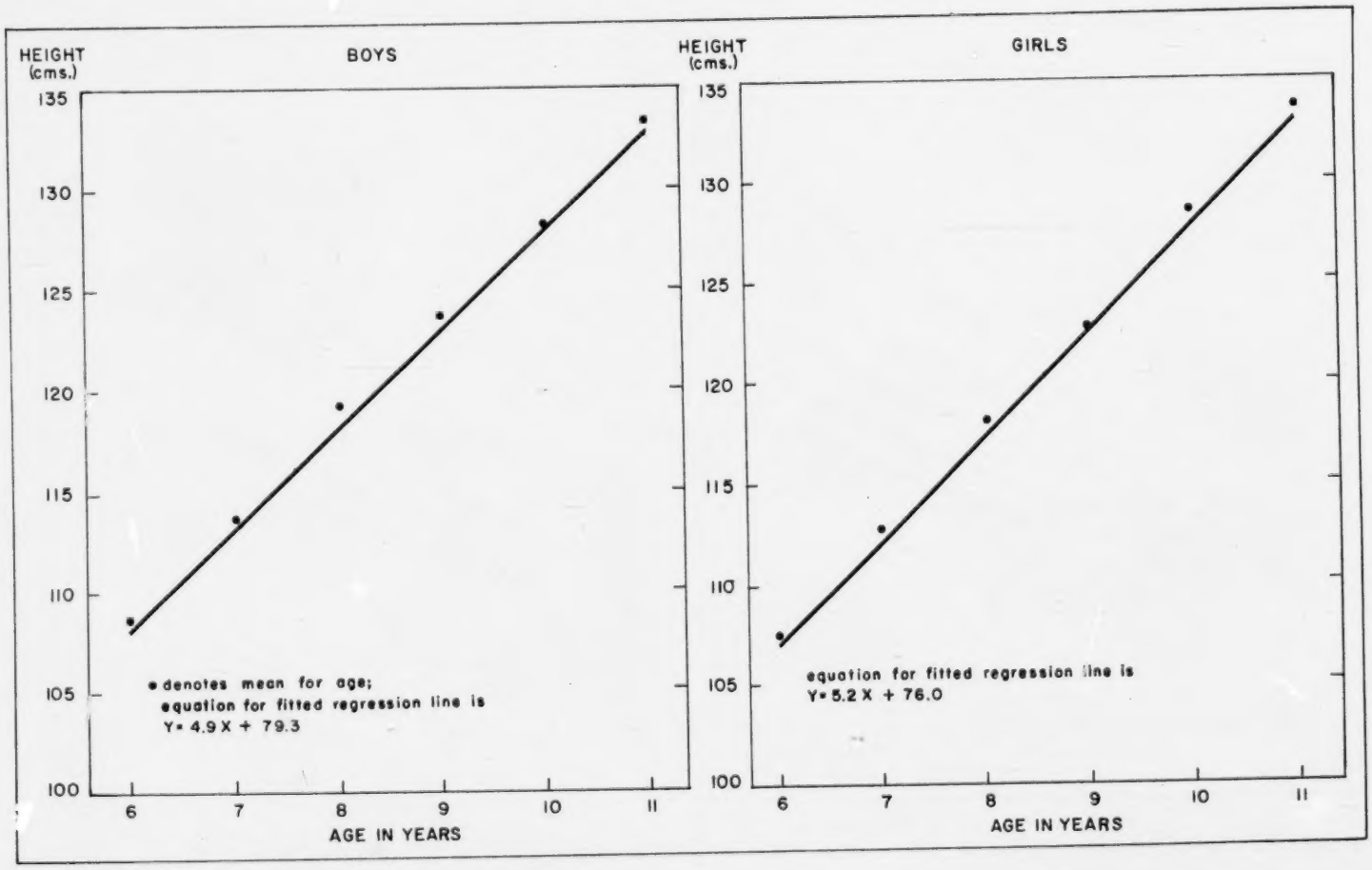

Figure 6. Mean heights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65.

$$\text{Height (cms.)} = 4.9 \times \text{Age (years)} + 79.3;$$

for girls it is

$$\text{Height (cms.)} = 5.2 \times \text{Age (years)} + 79.0 .$$

The differences between the sexes in mean heights were small, with boys being about 1 cm. (less than 1 percent) taller at ages 6 through 9 and with little difference at ages 10 and 11. The numerical increase in mean height for both boys and girls was about 5 or 6 cms. for each successive year of age. The percent increase was approximately 4 or 5 percent for each successive year of age.

Weight.—The mean weights of Indian children (table 5) showed a pattern similar to that of heights. The means increased regularly in nearly linear fashion, and the mean weights of boys exceeded those of girls at ages 6 through 9. The relative differences between the sexes in mean weight were slightly more pronounced than for height, with the mean weight of boys about 2 percent greater at ages 6 and 7, and of girls about 2 percent greater at age 11. The mean weight increased from about 16 kgs. at age 6 to about 26 kgs. by age 11 (fig. 7). The equation of the fitted regression for boys is

$$\text{Weight (kgs.)} = 1.89 \times \text{Age (years)} + 4.75;$$

for girls it is

$$\text{Weight (kgs.)} = 2.05 \times \text{Age (years)} + 3.29 .$$

Standard Deviations of Height and Weight Data

Standard deviations of the means for height and weight by sex and year of age are shown in table 5. Standard deviations of weight increased fairly regularly (both absolutely and relatively) with age and were considerably larger, relative to the means themselves, than those of height. Standard deviations of weight for both boys and

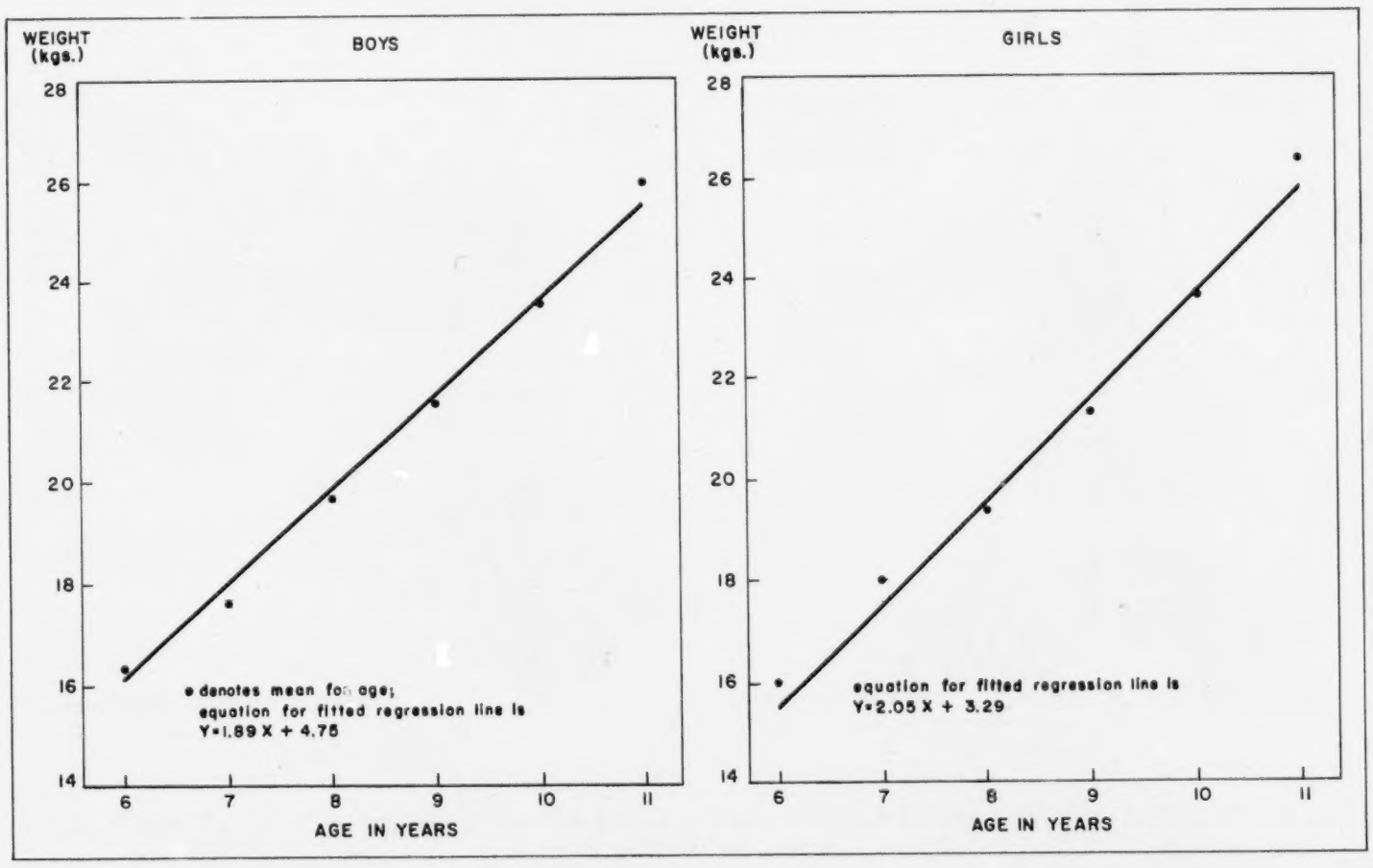

Figure 7. Mean weights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65.

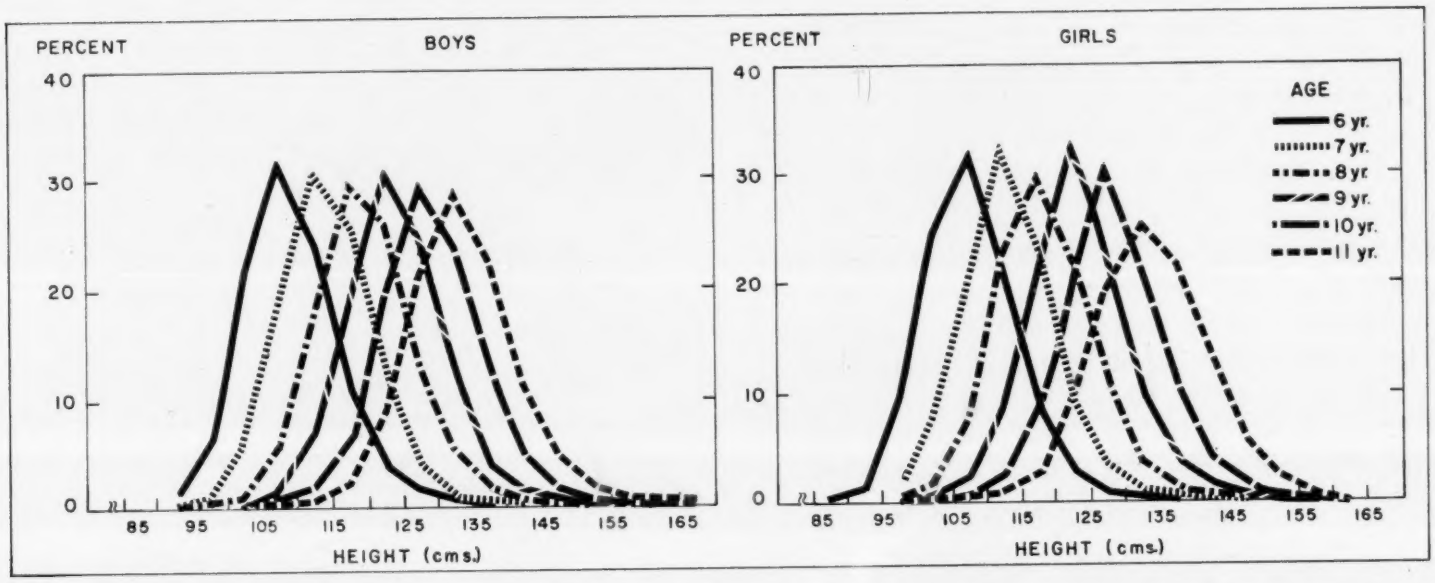

Figure 8. Percent of children aged 6 through 11 years in each specified height group, by sex and single year of age: India, 1956-65.

(Graphs are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

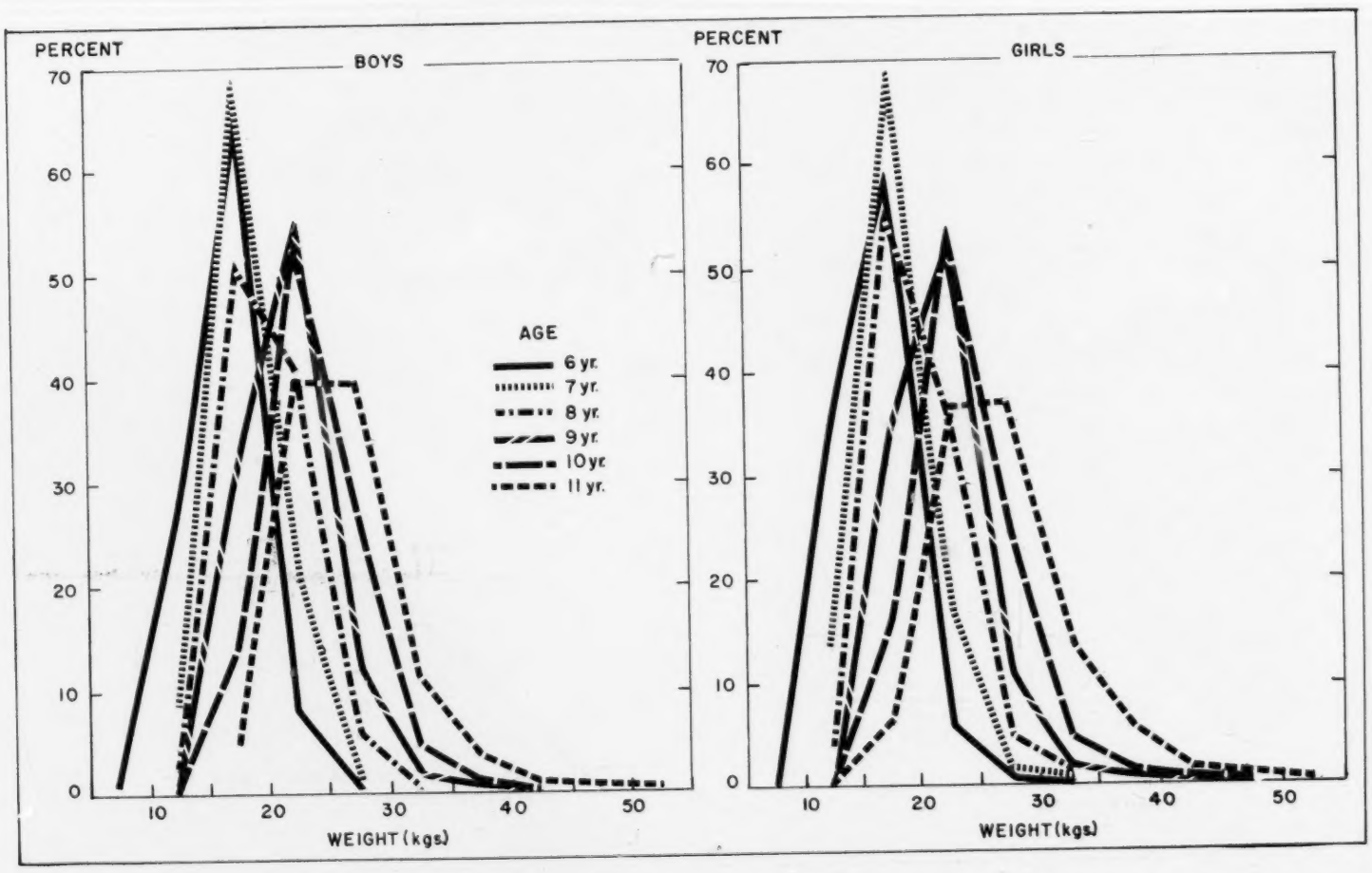

Figure 9. Percent of children aged 6 through 11 years in each specified weight group, by sex and single year of age: India, 1956-65.

(Graphs are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

girls were about 15 percent of the means at age 6 and increased to about 25 percent of the means at ages 10 and 11. For height, on the other hand, standard deviations increased somewhat irregularly with age and amounted to about 7 or 8 percent of the mean values.

Percent Distributions

Percent distributions of various height and weight groups are shown by sex and age in tables 6 and 7. For each designated height or weight interval, the tables show the percent of children in

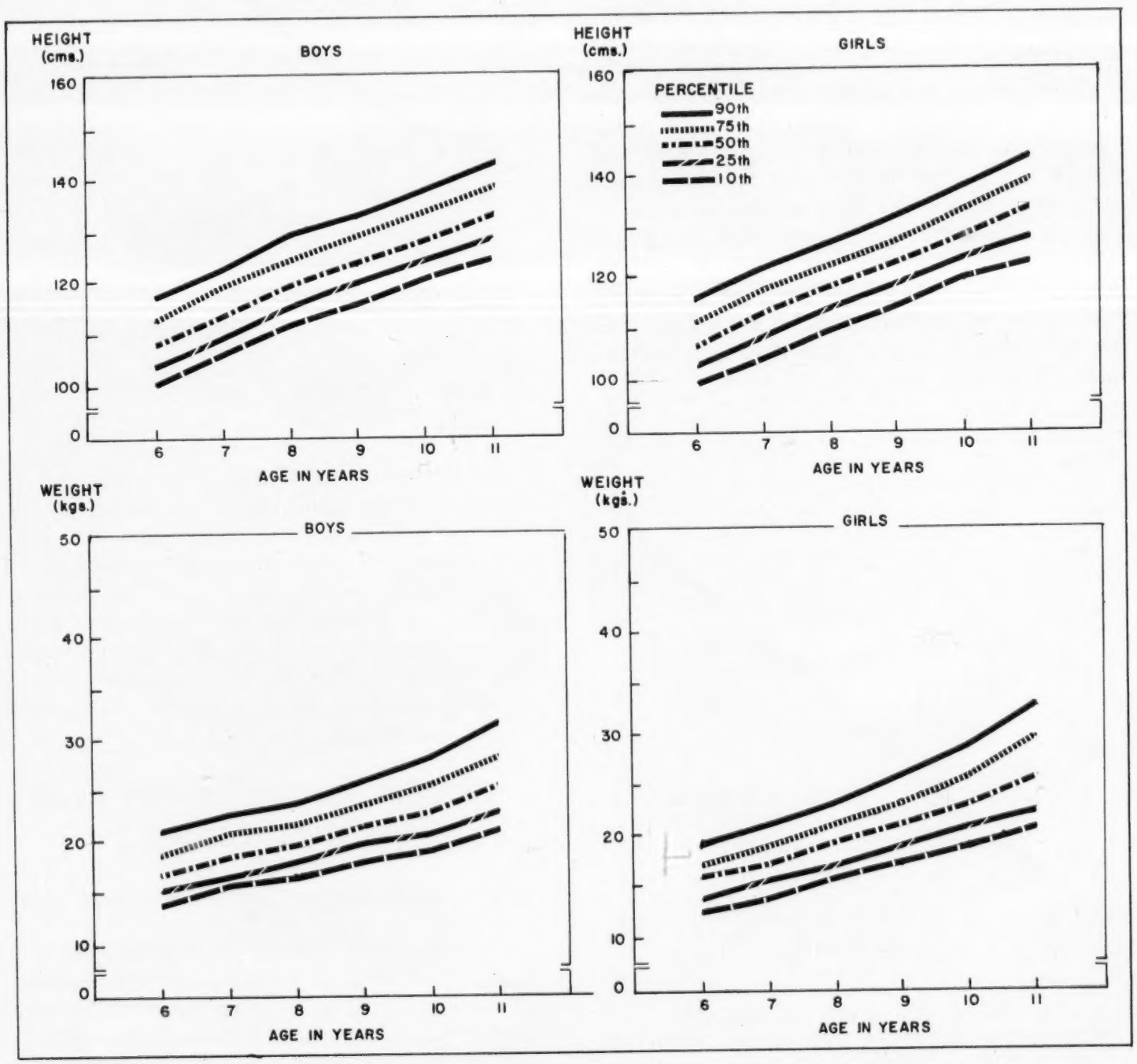

Figure 10. Selected percentiles of the height and weight distributions of children aged 6 through 11 years, by sex and single year of age: India, 1956-65.

the specified sex-age group with measurements falling within that range. Figures 8 and 9 display the same data graphically. It can be seen that the patterns are much the same for boys and girls, but that the two distributions for height present a somewhat different pattern from that seen for the weight.

The distributions for heights were similar at each year of age for both boys and girls. The pattern was that of a normal curve, and the modal group of the distribution increased by one interval with each increase in age. The curves shown for the distributions of weight appeared to be markedly more peaked for the younger ages and did not show the same upward shift of the modal groups with each increase in age. In part this may reflect the size of the grouping used for weight, but it also reflects the more compact distribution and more limited range of weights in the younger portion of the population at these ages. These changes in the distributions are implied by the increases in the coefficients of variation from 0.16 for both boys and girls at age 6 to 0.24 for boys and 0.21 for girls at age 11.

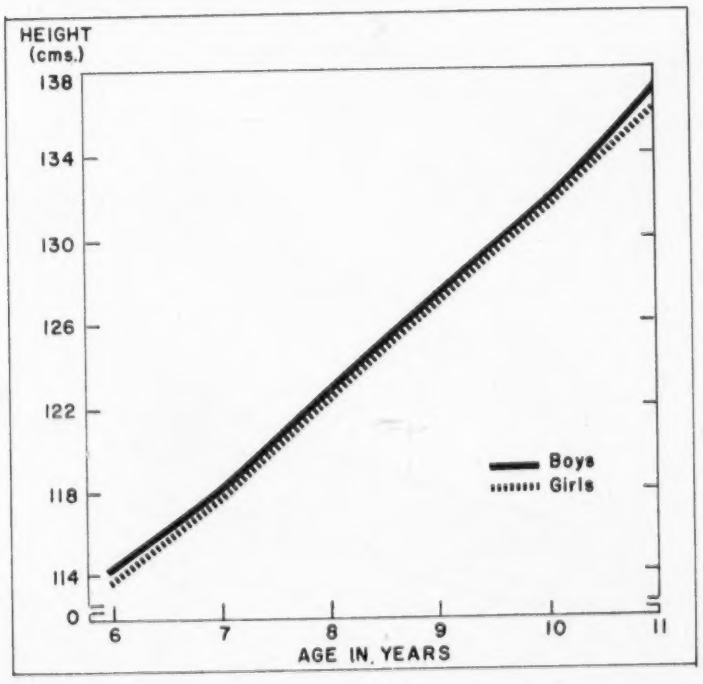

Figure 11. Mean heights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Eygpt), 1962-63.

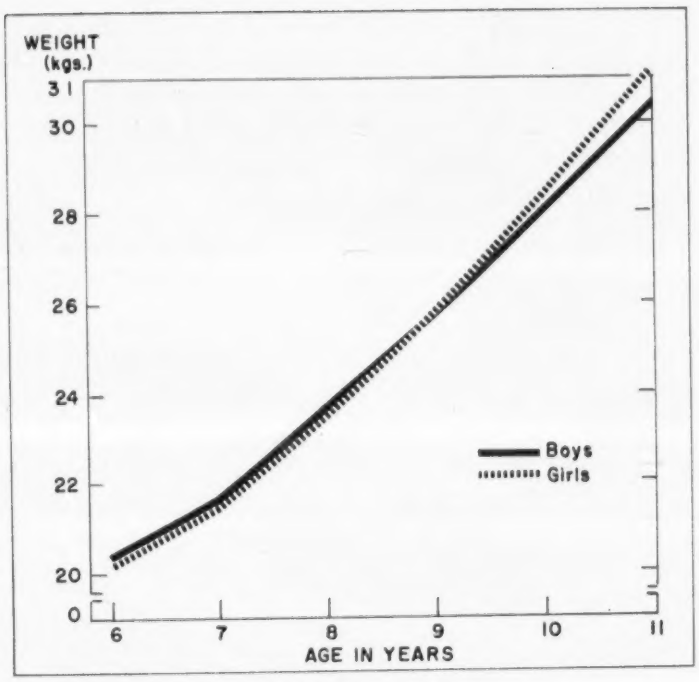

Figure 12. Mean weights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Eygpt), 1962-63.

Selected Percentiles of Height and Weight Distributions

The medians (or 50th percentile) for height of boys and girls at each year of age 6 through 11 was very nearly identical with the means. The medians and means were also quite similar for weight but not as closely so. For boys aged 6-8 the mean weights were slightly (less than 2 percent) below the corresponding median, while for boys aged 9-11 and for girls aged 6-11 the means were slightly (about 2 percent or less) above the medians (fig. 10 and table 8).

CHILDREN OF THE UNITED ARAB REPUBLIC (EGYPT)

Mean Height and Weight by Sex and Age

Height.— Mean heights for both boys and girls of the United Arab Republic (UAR) increased in an almost linear fashion by about 4 percent for each single year of age from 6 through 11 years. At age 6 the mean height of UAR boys was 114.2 cms.

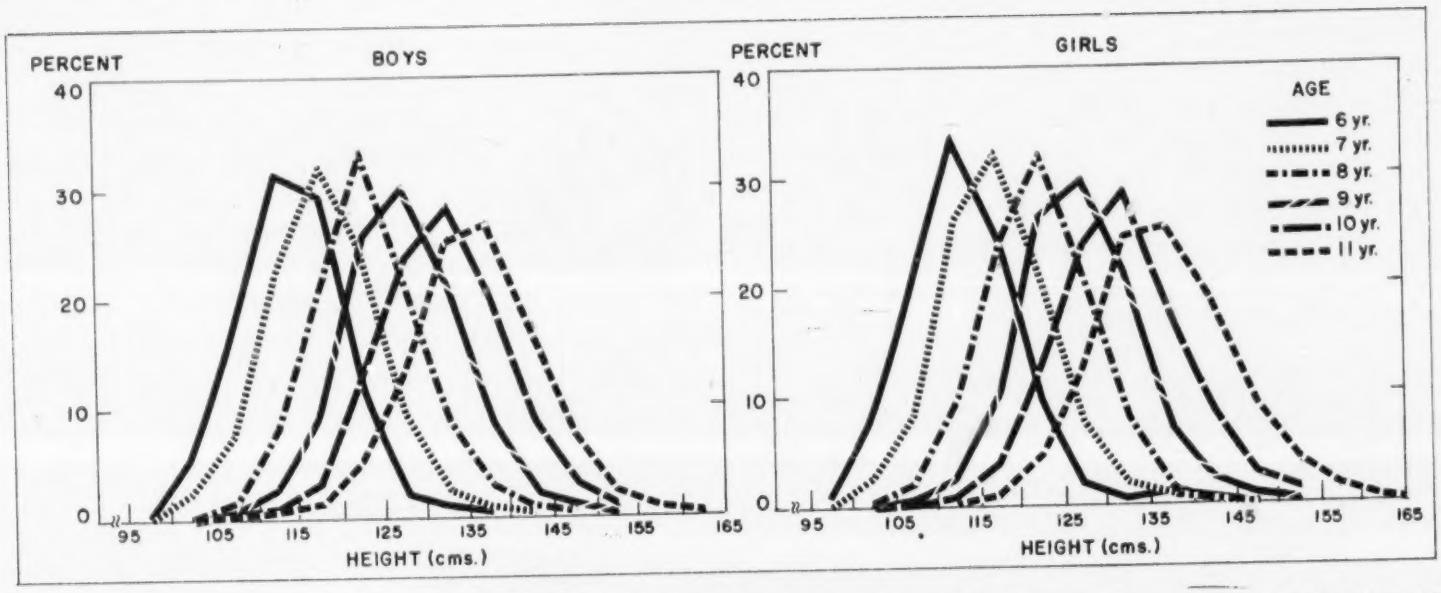

Figure 13. Percent of children aged 6 through 11 years in each specified height group, by sex and single year of age: United Arab Republic (Egypt), 1962-63.

(Grapns are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

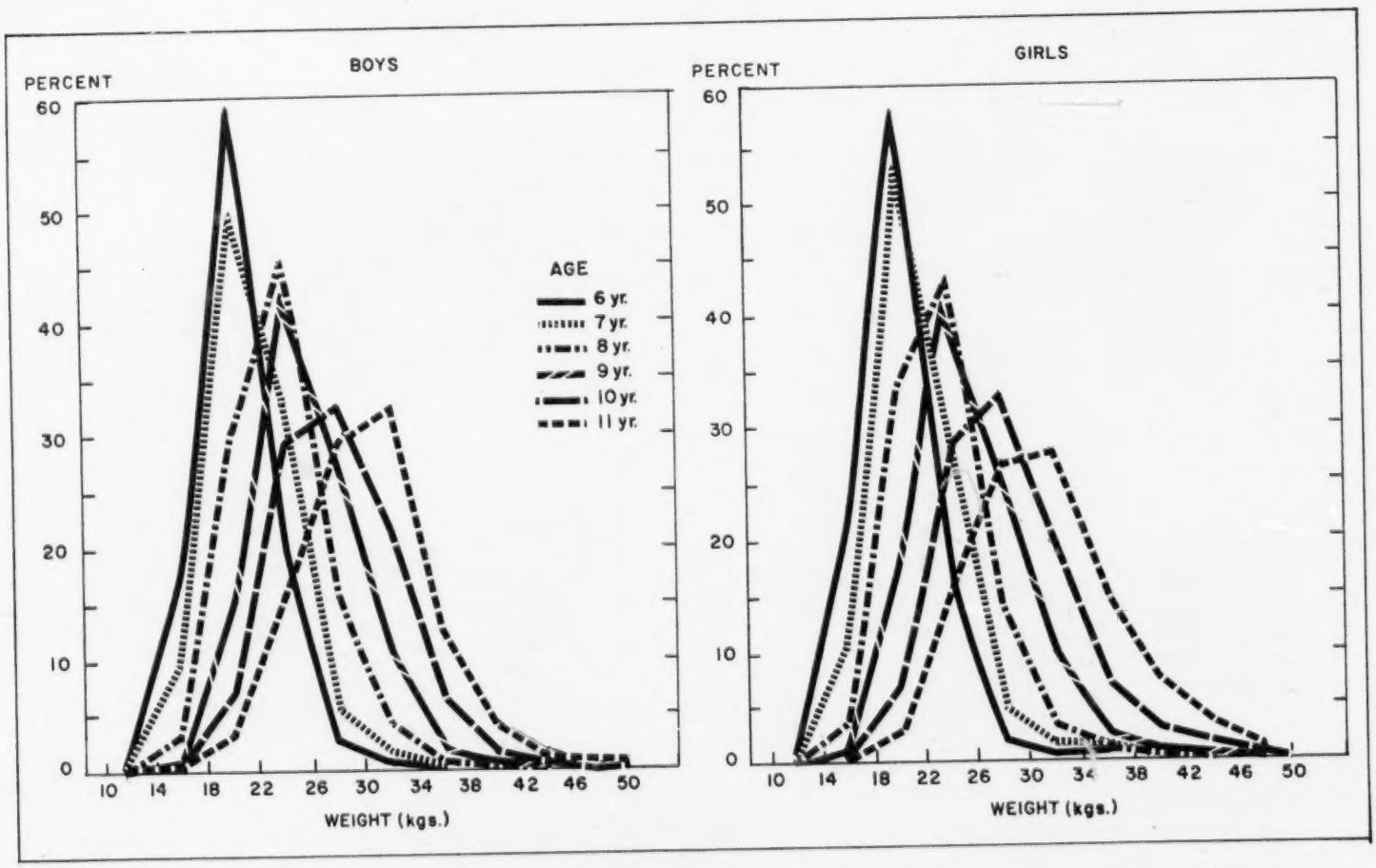

Figure 14. Percent of children aged 6 through 11 years in each specified weight group, by sex and single year of age: United Arab Republic (Egypt), 1962-63.

(Graphs are lines connecting points plotted opposite appropriate percent and at midpoints of the grouped intervals of the frequency polygon of each distribution)

For girls the mean was 113.5 cms. lower than for boys by less than a centimeter. The very slight difference in the means by sex decreased further for each year of age as the means increased. Those for girls increased slightly faster than for boys until at age 10 girls were only 0.1 cm. below the boys. By age 11 the mean height of girls was 1 cm. above that for boys, 136.9 cms. compared with 135.9 (table 9 and fig. 11).

Weight.—Like height, the mean weights for both boys and girls were very close together at ages 6 through 11. Boys were slightly heavier at ages 6-8, but this advantage disappeared by age 9, and by age 11 girls outweighed boys on the average. The weights rose rather sharply for each single year of age, from 20.3 kgs. to 30.3 for boys and from 20.1 kgs. to 31.1 for girls (table 9 and fig. 12).

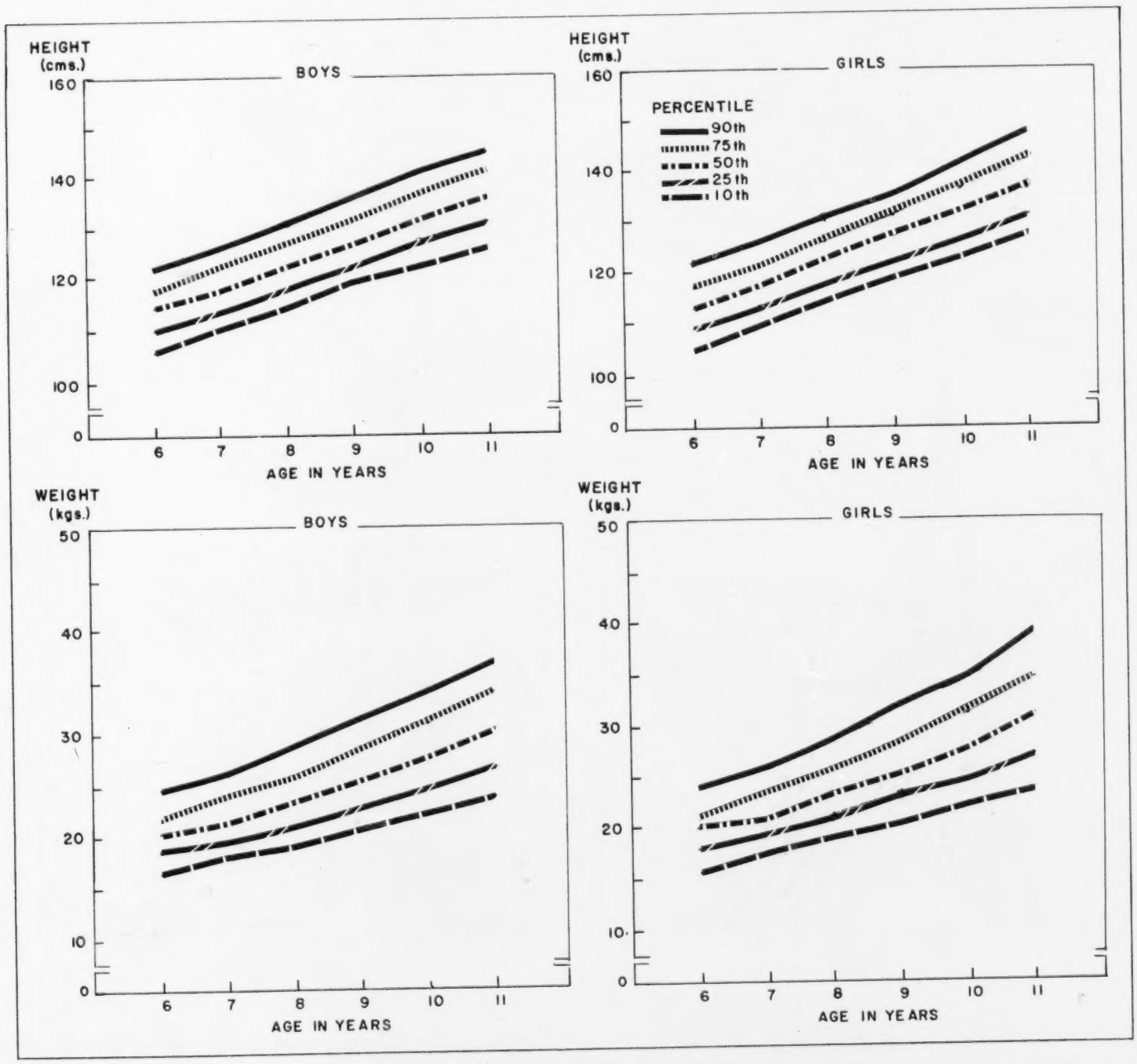

Figure 15. Selected percentiles of the height and weight distributions of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63.

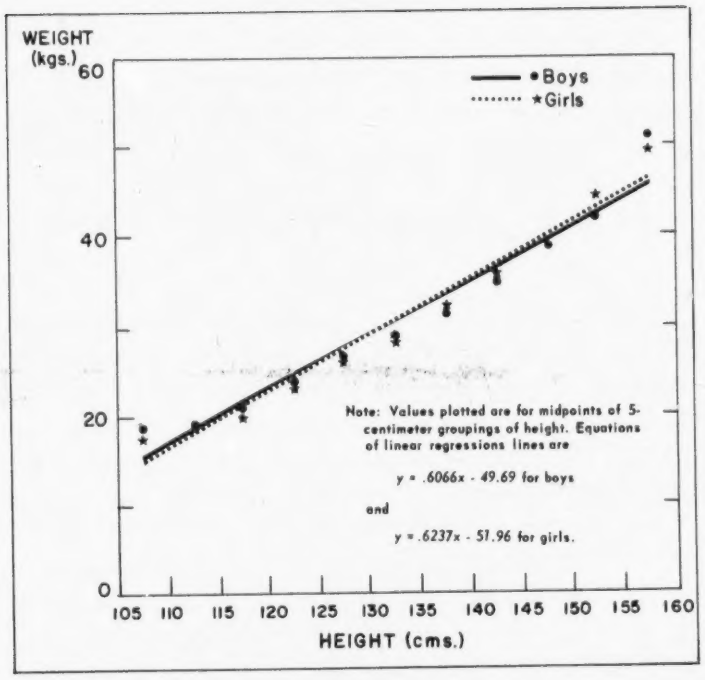

Figure 16. Mean weight of children aged 6 through 11 years, by height and sex: United States, 1963-65

(Arithmetic scale)

Standard Deviations of Height and Weight Data

The standard deviations of the means for both height and weight of UAR children are shown in table 9 for each year of age. Standard deviations for both height and weight were slightly higher for girls than for boys, and they increased somewhat irregularly for both sexes throughout the age range. The standard deviations for weight were relatively higher than for height. The coefficients of variation were between 5 and 6 percent for height and around 15 to 18 percent for weight.

Percent Distribution

Percent distribution for various height and weight groups are shown by sex and single year of age in tables 10 and 11. Figures 13 and 14 make it apparent that each of the distributions approximates a normal curve, with heights showing less departure from normality than the weights. The modal group for height increased regularly by one 5-centimeter classification for each year of age.

Distributions for weight are more peaked, particularly at 6 and 7 years of age. At the older ages the distributions are somewhat more skewed towards the higher values.

Selected Percentiles of Height and Weight Distributions

The 10th, 25th, 50th, 75th, and 90th percentiles of the distributions of height and weight are shown in table 12 and figure 15. The value of height or weight that divided the lowest and the highest 10 percent—for example, 10th and 90th percentiles—of the population from the others are shown separately by sex. It is seen that the range at each age was quite great. Thus the top 10 percent of both boys and girls aged 6 years had weights that were higher on the average than the bottom 10 percent of the 11-year-olds. The 90th percentile for height of 6-year-olds was about the same as the 10th percentile for the 10-year-olds. The maximum interdecile range (90th minus 10th percentile) increased steadily throughout the age range. The range for height increased from about

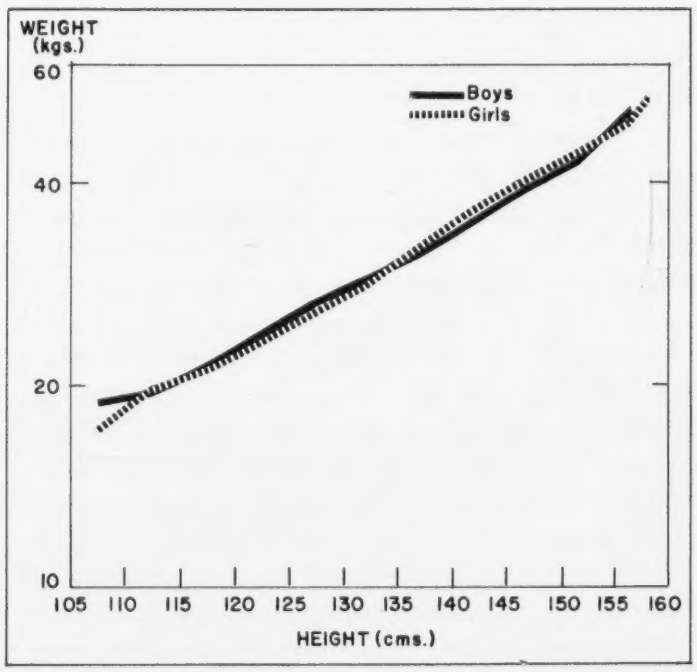

Figure 17. Mean weight of children aged 6 through 11 years, by height and sex: United States, 1963-65

(Semilogarithmic scale)

16 cms. to about 19 for both boys and girls, while for weight it increased from about 8 kgs. for both sexes to over 13 for boys and over 15 for girls. This is another perspective on the extent to which the distribution of weight is more dispersed (or less compact) relative to height distribution, and it becomes still more so with increasing age. This was also seen from the coefficients of variation.

RELATIONSHIP BETWEEN HEIGHT AND WEIGHT

CHILDREN OF THE UNITED STATES

The fact that there is a high positive correlation between weight and height—weight increasing as height increases—is well known. Since there are marked sex differences in both of these variables at various times in the growth process and since both are highly correlated with age for the ages of growth and development, it seems reasonable, a priori, to examine the relationship between height and weight in subgroups which are age- and sex-specific. This was done in the tabulation of data for U.S. children, and some of the results are presented in tables 13 and 14. The tables show the mean weights and selected percentiles separately by sex for each year of age 6 through 11.

Examination of the age-sex specific data reveals that in this age range, age appeared to have had relatively little influence on the height-weight relationship. This was generally true whether one examined the mean weights, the various percentiles, or the ratio of weight to height.

Whereas mean weight increased from 3 to 5 kgs. with each successive year of age when height was disregarded and it increased on the average of about 3 kgs. with each successive 5-centimeter height grouping when age was disregarded, it varied only slightly with age when height was held constant. Thus, for example, for boys who were between 125 and 130 cms. in height, the mean weights at each successive year of age 6 through 10 were 25.77, 26.12, 26.00, 26.13, and 26.72 kgs., respectively. The corresponding weights for girls in the same height group were 26.46, 26.31, 25.78. 26.06, and 25.56 kgs. Other height groups show more or less the same picture for the data available for these ages. There was a suggestion in the data that this may be somewhat less true at the ages for which the particular height group represents the extreme value reached by persons of that age, but the numbers were not large enough to draw a conclusion. At least for either sex at each single year of age 6 through 11 and for the range of heights which included over 95 percent of the persons in a specific age-sex group, the height-weight relationship seemed to be relatively independent of age. This may not be true at other ages, particularly the ages of adolescent growth.

Because age made so little difference in the height-weight relationship as seen in these data, it was decided to combine the data by sex for the entire sample in further examination of this association. Table 15 shows the combined age data for boys and for girls. Although the data have been shown separately for the two sexes it is apparent

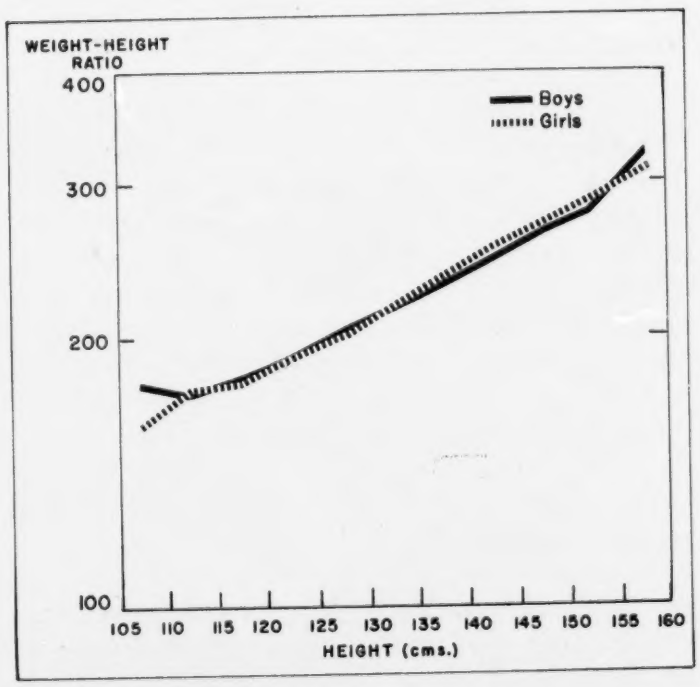

Figure 18. Weight-height ratios (grams per centimeter) for children aged 6 through 11 years, by sex: United States. 1963-65.

(Ratios are relations of mean weights for 5-centimeters height groups to midpoint of those groups)

that sex, like age, had relatively little effect on this relationship.

The relation between height and weight is readily seen in figure 16. The pattern is remarkably similar for boys and girls. The values shown in the graph are the mean weights for each of the 5-centimeter height groupings, plotted at the midpoint of the intervals. The relation between the two variables is nearly linear for the middle range of heights shown, but for the full range the linear regression line shown does not give a particularly good fit. The same data are shown in figure 17, where the vertical axis is on a logarithmic scale. Here the linearity indicates that the proportionate increases in weight with successive increases in height are very nearly equal.

It was noted that for specific heights of children 6-11 years, weight was relatively independent of year of age. Table 16 shows this for the weight-height ratios. Also shown is the very clear increase in the ratios (expressed as grams weight per centimeter height) with increasing height. The range of the ratios was from less than 200 to more than 300 grams per centimeter. The ratio increased fairly regularly with increasing height. Figure 18 displays this separately for boys and girls although the patterns for the two sexes were quite similar. The graph is very nearly linear, except for the extreme values at both ends of the range. Here, again, it is seen that the successive height increases produced proportionate weight increases since the weight values were plotted on a logarithmic scale.

Table 17 shows not only the mean weights for successive height intervals but also the values for five selected percentiles. These are plotted on semilogarithmic scale in figure 19. The patterns for boys and girls are remarkably similar. The values for each of the percentiles showed consistent increases in weight with increases in height, and the proportionate increases were very nearly constant. It appears from these data that the mean

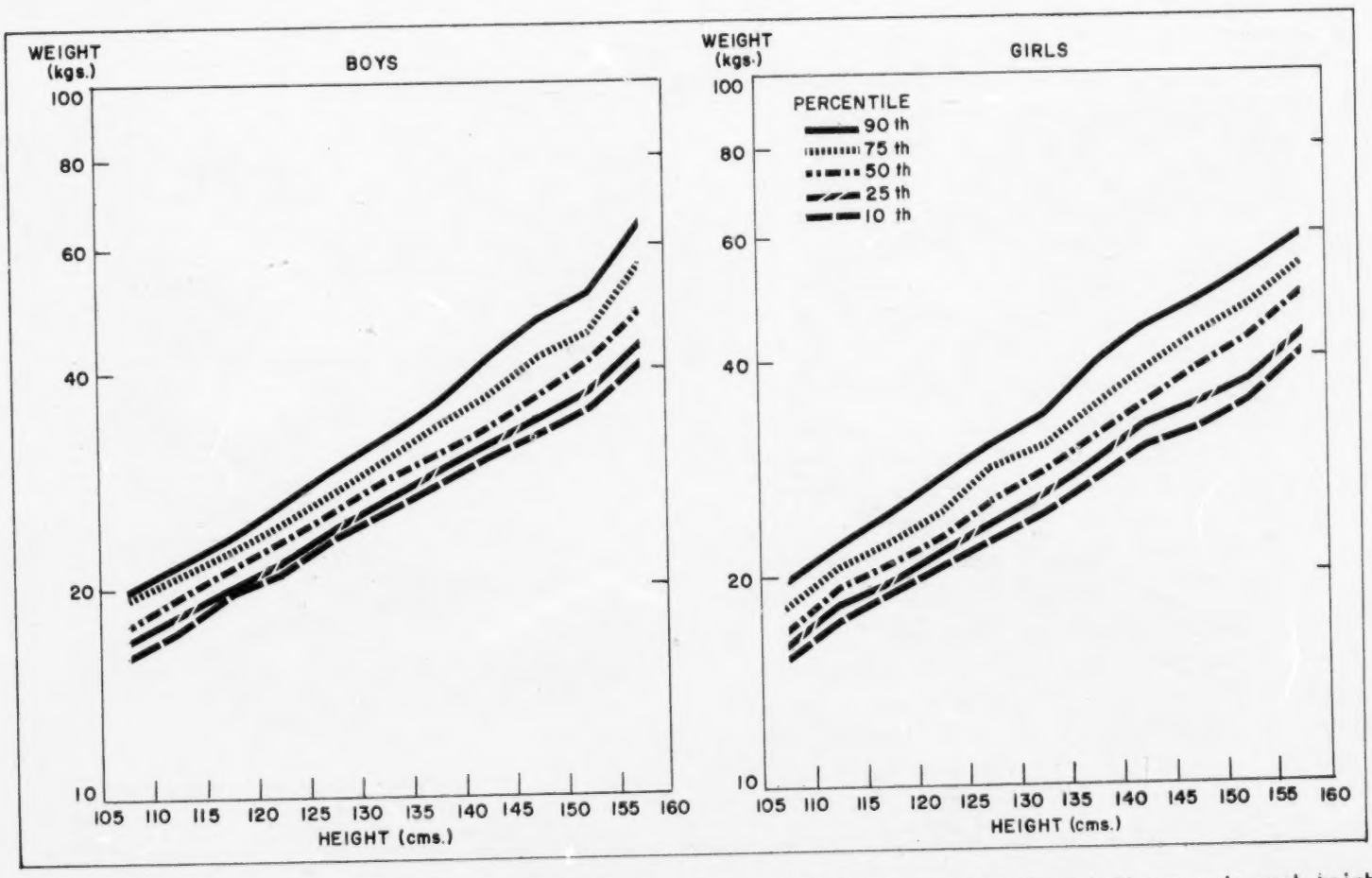

Figure 19. Selected percentiles of the weight distributions for children aged 6 through 11 years in each height group, by sex: United States, 1963-65.

weight of each successively greater height group increased by approximately 10 percent. Since these are 5-centimeter height groups, it might be restated as follows: in the range of heights observed for both boys and girls, each successive increase of a centimeter of height was associated on the average with an increase of roughly 2 percent in the weight. This was generally true of each of the various parameters examined, not only the mean and the median but the 10th, 25th, 75th, and 90th percentiles as well. It was generally true for both boys and girls.

CHILDREN OF INDIA

Coefficients of correlation between height and weight were computed for each of the 12 sex-age groups and all fell between 0.69 and 0.77.

The increase in weight with increase in height was examined separately by sex and single year of age. The pattern of the height-weight relationship was almost identical for each of the ages and for both sexes. The only notable exception was in the pattern for 11-year-old boys. Here, taking age into account did make some difference. Thus, for example, an 11-year-old who fell in the height group of 115.0-119.9 cms. and who weighed about 19 kgs. would be at about the 10th percentile of the weight distribution for 11-year-old boys of this height, but he would be at about the 50th percentile for the corresponding distribution of all boys 6-11 years. A boy at any of the ages 6 through 10 would be at about the median of both the distribution for his particular age and the distribution for boys 6-11 years. Similarly, a boy of the same height (115.0-119.9 cms.) who weighed 21 kgs. would be at about the mean or median of the weight distribution for his specific year of age if he was 11 years old, but he would be at the 90th percentile if he was any one of the ages from 6 through 10 years. The same kinds of examples could be given for boys in the height groups 120.0-124.9 cms. and

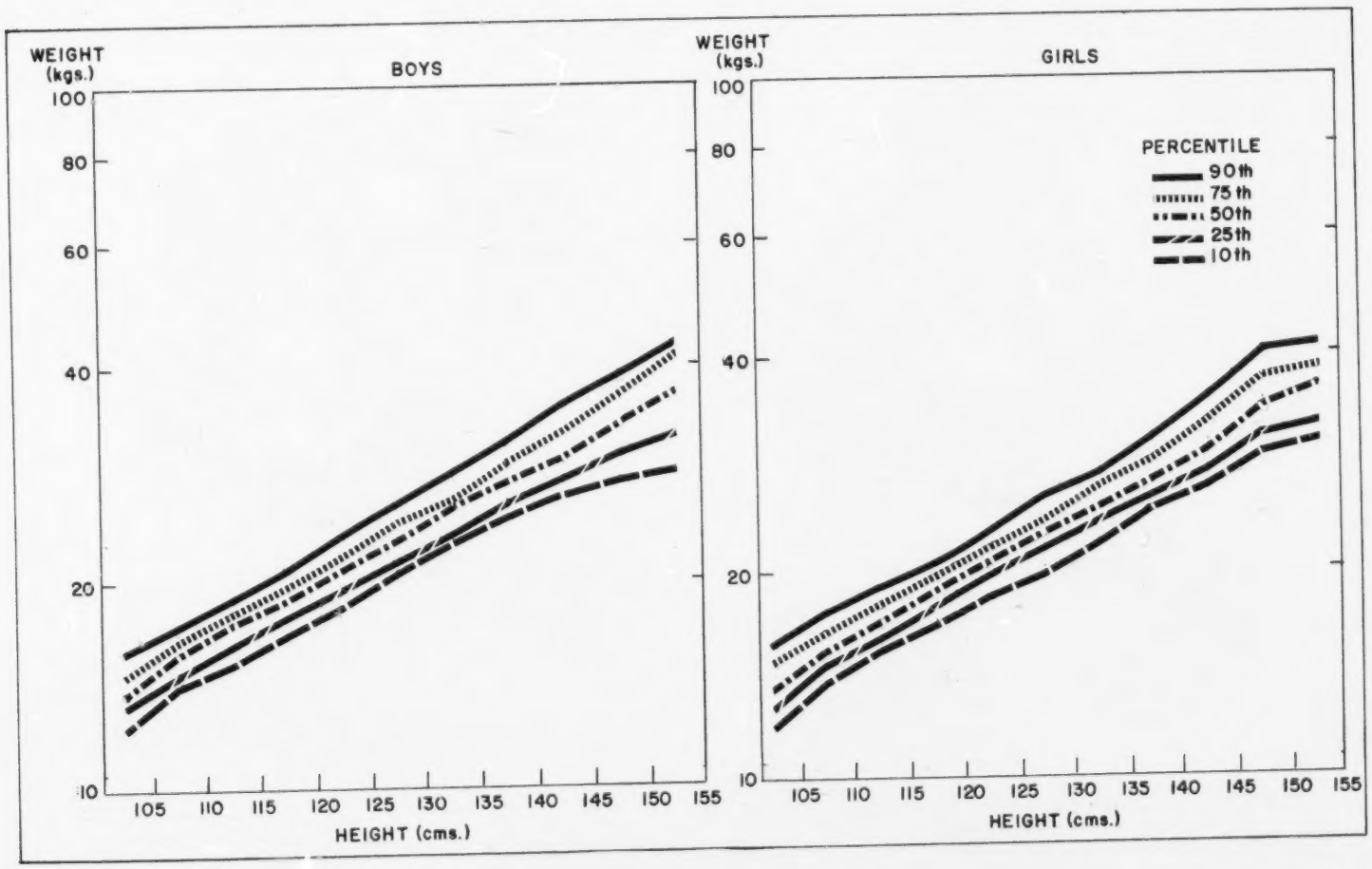

Figure 20. Selected percentiles of weight distributions for children aged 6 through 11 years in each height group, by sex: India, 1956-65.

125.0-129.9 cms., and they would show the same exception status as for the 11-year-old.

Table 17 and figure 20 show the means and selected percentiles of the distribution of weight cross-classified by height for all boys and all girls, respectively, at ages 6-11 combined. Because of the relative inappropriateness of these combined data for 11-year-old boys in some instances, separate data for them are shown in table A.

As seen from figure 20 (where the vertical scale is logarithmic) the proportionate increase in weight with each increase in height was very nearly constant, about 10 percent. This was true of the mean and generally true of each of the selected percentile values shown.

CHILDREN OF THE UNITED ARAB REPUBLIC (EGYPT)

There is a marked, direct correlation between weight and height of children at ages 6 through 11 years. Those children who were less than 115.0 cms. in height had a mean weight of less than 20 kgs., while those whose height was more than 150.0 cms. had a mean weight more than twice this figure. The increase was roughly about the same proportion with each successive height group—about 10 percent increase. Table 18 shows these successive increases separately for boys and girls aged 6-11 years. Figure 21 shows this for selected percentiles.

The relationship was examined separately for each individual year of age. Although the height-weight relationship was quite similar for each age, there appeared to be some age factor present in the relationship, although the effect was not a marked one. Thus, boys in a particular height group tended to have a slightly greater mean weight as age increased. For example, for boys who were between 120.0 and 124.9 cms. in height, the mean weights (in kgs.) at successive ages 6 through 11 years were as follows: 22.9, 22.9, 23.3, 23.7, 24.0, and 26.3. Table B shows mean weights by sex for specified height groups. The relationship between height and weight is seen clearly by examing the weight-height ratios shown in table 19. Here too, it is evident that the ratio mean weight to height not only increased with increasing height but it tended to be higher for children at the older ages even when height is held constant.

Table A. Selected percentiles of weight distribution of boys aged 11 years at successive grouped height intervals: India, 1956-65

Height (cms.)	Number measured	Mean weight	Percentile				
			10	25	50	75	90
			Weight (kgs.)				
Less than 105.0	1	16.3	-	-	-	-	-
105.0-109.9	1	17.4	-	-	-	-	-
110.0-114.9	12	19.3	-	-	-	-	-
115.0-119.9	72	21.0	19.0	20.0	21.1	22.4	23.4
120.0-124.9	310	23.0	20.8	21.8	23.2	24.5	25.5
125.0-129.9	722	24.9	22.5	23.7	25.0	26.4	28.0
130.0-134.9	1,033	27.3	24.5	25.8	27.4	28.9	30.8
135.0-139.9	799	29.9	26.8	28.2	29.8	31.6	33.8
140.0-144.9	391	32.7	29.0	30.7	32.5	35.0	37.1
145.0-149.9	163	35.6	31.7	33.4	36.2	38.7	39.9
150.0-154.9	68	40.8	36.5	37.5	40.6	42.6	45.8
155.0-159.9	21	45.6	-	-	-	-	-
160.0-164.9	6	44.6	-	-	-	-	-
165.0 or more	-	-	-	-	-	-	-

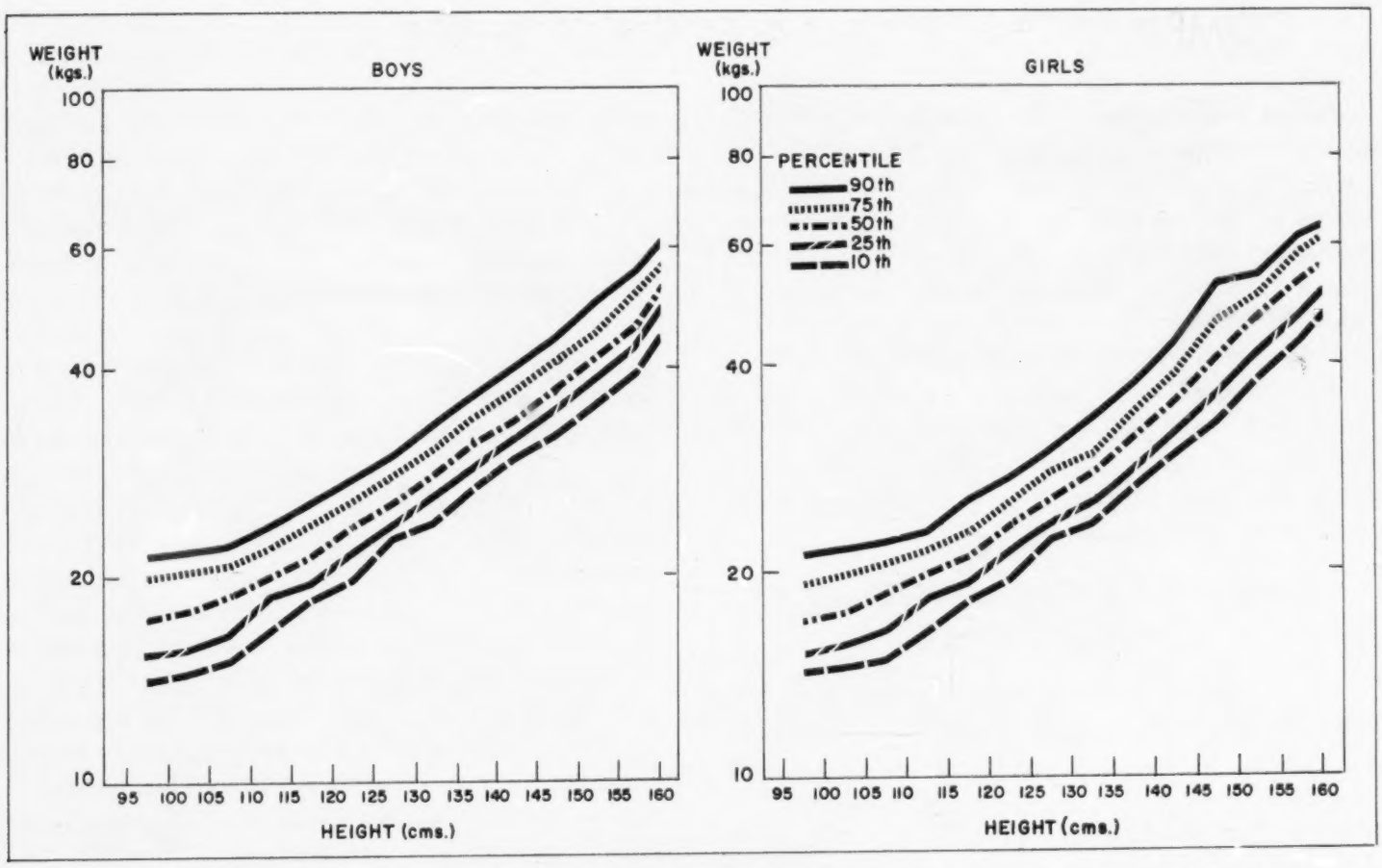

Figure 21. Selected percentiles of weight distributions for children aged 6 through 11 years in each height group, by sex: United Arab Republic (Egypt), 1962-63.

Table B. Mean weights of children aged 6 through 11 years at specified heights, by sex and single year of age: United Arab Republic (Egypt), 1962-63

(Heights are those at midpoint of 5-centimeter height groups. Data not computed for less than 20 measured persons)

Sex and age	Height (cms.)									
	107.5	112.5	117.5	122.5	127.5	132.5	137.5	142.5	147.5	152.5
	Weight (kgs.)									
Boys										
6 years	18.5	19.8	21.0	22.9	24.4	25.8	...	...	...	...
7 years	18.5	19.9	21.3	22.9	24.9	27.3	29.1	32.3	...	...
8 years	19.1	20.3	21.5	23.3	25.2	27.6	30.8	31.9	34.3	...
9 years	...	21.0	21.9	23.7	25.4	27.7	30.1	32.5	35.2	38.4
10 years	...	...	22.3	24.0	25.7	28.2	30.5	33.3	35.6	38.9
11 years	...	22.9	24.5	26.3	28.5	31.0	33.4	34.8	39.2	40.9
Girls										
6 years	18.3	19.7	20.8	22.6	24.6	26.7	...	...	...	...
7 years	18.6	19.8	21.0	23.0	24.8	26.7	29.9	...	...	...
8 years	...	20.1	21.4	23.3	25.2	27.7	30.0	32.5	...	...
9 years	...	20.5	21.9	23.5	25.6	28.0	30.8	33.5	35.8	39.6
10 years	...	...	22.3	24.2	26.0	28.4	30.8	34.2	36.8	42.1
11 years	...	...	...	24.5	26.0	28.7	31.3	34.5	37.6	41.7

COMPARISON OF DATA FOR THE THREE COUNTRIES

ABSOLUTE VALUES AND THEIR DISTRIBUTIONS

The data for height and for weight of children aged 6-11 years for the three countries studied here present three clearly distinct levels. The U.S. children had mean heights and weights considerably above those of the Indian children, while the UAR children had means that were intermediate (tables 20 and 21; fig. 22).

Indian children had mean heights which fell about 9 percent below those of children of the United States at every age. Mean heights of UAR children were intermediate—nearer but above the Indian level and about 4 percent below the U.S. means at age 6, with the difference increasing to where they were about 7 percent below at age 11. Stated another way, the means for heights of Indian children at every age from 6 through 11 years fell below the comparable U.S. means by nearly two standard deviations. UAR children aged 7 through 11 fell a little more than one standard deviation below the means for the U.S. children; those aged 6 years were a little closer to their U.S. counterparts.

The comparisons with respect to mean weights were somewhat similar. Means for U.S. children were considerably above those for the other two countries, those for UAR children were intermediate, and for children of India they were lowest at each single year of age. UAR children had mean weights which were a little less than one standard deviation below the means for U.S. children. Means for Indian children fell about 1½ standard deviations below those for U.S. children at each single year of age. In terms of the relative magnitude of the weight means, Indian children were about 30 percent and UAR children were roughly 10 to 20 percent below U.S. children.

In comparing the heights of children of the United States, India, and the United Arab Republic, it is interesting to look at some of the available data concerning the average heights of children of the United States at an earlier period. It is known that heights of children of the United States have increased during the past half century. While no truly comparable data are available from any earlier period, there are a number of studies[7] of selected groups of children that demonstrate this increase. Table 23 shows the mean heights of U.S. children aged 6 through 11 years at four different time periods based on the best available data. The means for the U.S. children for the period about 60 years earlier were only slightly lower than the current data for UAR children and slightly higher than those for Indian children.

The patterns displayed by the distributions of both height and weight show many similarities among the three countries. All of the curves tend towards a normal distribution. For the most part the standard deviations for height and for weight increased from year to year. In the case of weight, but less so for height, there was usually some increase in the coefficient of variation (the standard deviations relative to the mean) with age. In all three countries the weights displayed far more relative variability: the coefficients of variation for the weights were about 3 to 4 times as great as those for height in each country and for each age and sex group. The coefficients of variation for height (but not weight) of Indian children tended to be somewhat higher than in the other two countries. This reflects the lower means for height of Indian children being accompanied by relatively high standard deviations of the heights. The coefficients of variation for height were between 5 and 6 percent for the U.S. and UAR children, and mostly between 7 and 8 percent for Indian children. The coefficients of variation for weight range between 15 and 25 percent in all three countries. While the mean weights in the United States were clearly higher than in the other two countries, the standard deviations of the mean weights were correspondingly higher in the United States.

Comparison of selected percentiles of the distributions of height and weight showed clearly the fact of the three different levels of values for the three countries. The 25th, 50th, and 75th percentiles at each year of age for both boys and girls were highest for the United States, lowest for India, and intermediate for Egypt (table 22). In each of the comparisons the 25th percentile for U.S. children was higher than the 75th percentile for Indian children. In 10 of the 12 comparisons the 25th percentile for U.S. children was above the 50th (or median) for UAR children.

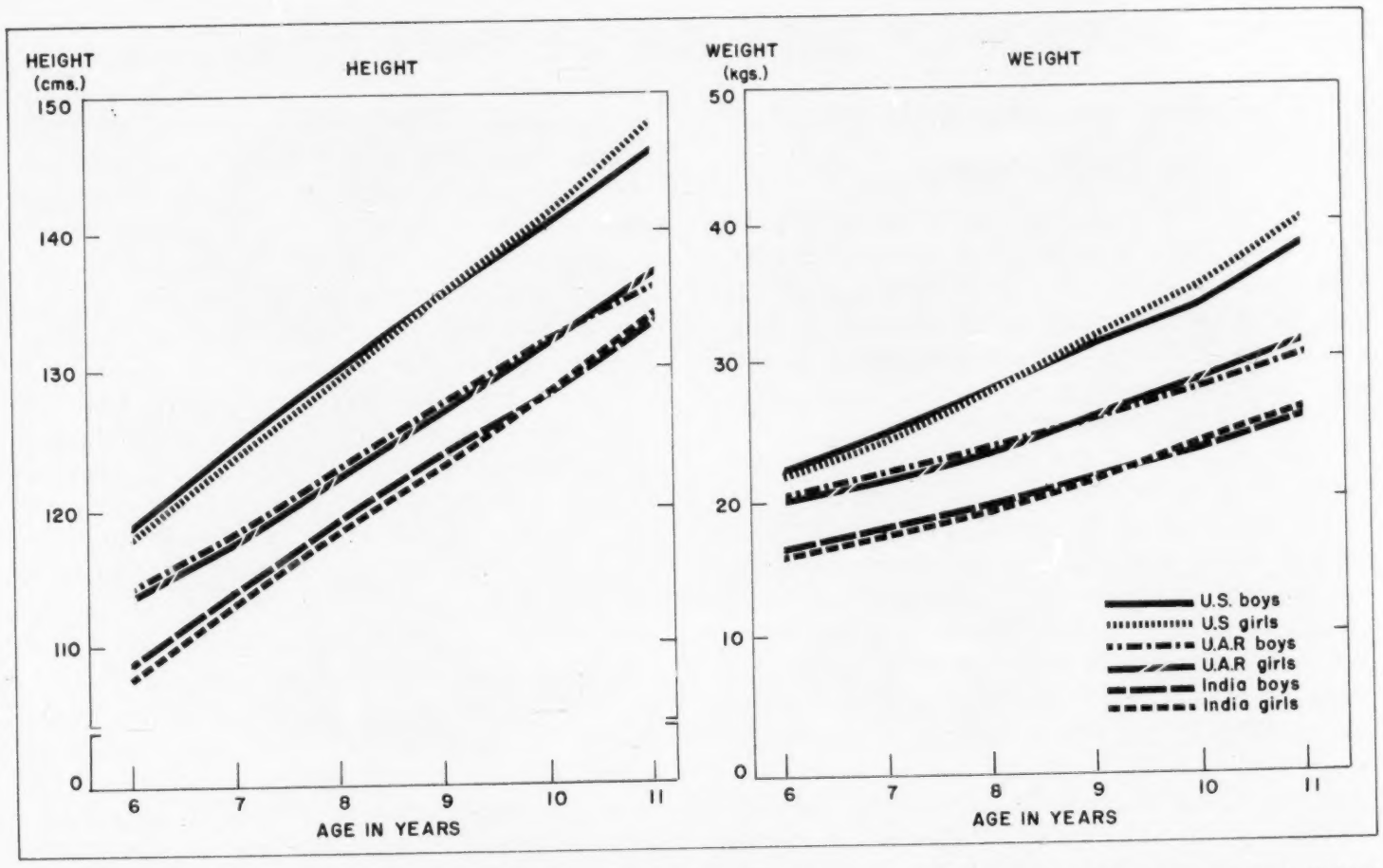

Figure 22. Mean height and weight for children aged 6 through 11 years, by sex and single year of age: United States, United Arab Republic, and India.

INTERRELATIONSHIP BETWEEN HEIGHT, WEIGHT, AGE, AND SEX

The variability of height and weight with age and with sex is very nearly the same in each of the three countries, although the overall levels at which the means fall do differ, as seen above. There was a steady, nearly linear, increase in height with increasing age. Weight also increased with age, but showed some greater variability. Both height and weight showed increases in the standard deviations with increasing age throughout the age range as has been noted. Within each of the three countries, the means for boys and girls were quite close together, and the pattern was for boys of all countries to be slightly taller and slightly heavier than the girls in the early part of the age range and for girls to catch up and/or surpass the boys by at least age 11. The point at which the girls surpassed the boys varied a little among the three countries, with the event occurring earliest for U.S. children.

In each country weight was highly correlated with height. As height increased, weight increased both absolutely and relatively. In other words, with each increase in 5-centimeter height groups, not only did the mean weight increase but the ratio of weight to height also increased. The relative weight (kgs. of weight per cms. of height) was slightly different among the three countries, with the United States having the highest relative weights and India the lowest. The pattern was essentially the same, however, in all three countries.

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DETAILED TABLES

		Page
Table 1.	Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with number of children in the total U.S. population and actual number of children measured: United States, July 1963-December 1965	30
2.	Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965	31
3.	Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965	32
4.	Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965	33
5.	Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with actual number of children measured: India, 1956-65	34
6.	Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65	35
7.	Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65	36
8.	Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: India, 1956-65	37
9.	Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with actual number of children measured: United Arab Republic (Egypt), 1962-63	38
10.	Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63	39
11.	Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63	40
12.	Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63	41
13.	Selected percentiles of weight distribution of boys aged 6 through 11 years at successive grouped height intervals, by single year of age: United States, July 1963-December 1965	42
14.	Selected percentiles of weight distribution of girls aged 6 through 11 years at successive grouped height intervals, by single year of age: United States, July 1963-December 1965	43
15.	Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: United States, July 1963-December 1965	44
16.	Weight-height ratios at specified heights of chilren aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965	45
17.	Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: India, 1956-65	46

DETAILED TABLES—Con.

		Page
18.	Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: United Arab Republic (Egypt), 1962-63	47
19.	Weight-height ratios at specified heights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63	48
20.	Comparison of weight-height ratios at specified heights of children aged 6 through 11 years, by sex: United States, United Arab Republic (Egypt), and India	49
21.	Comparison of means for height and weight of children aged 6 through 11 years, by sex and single year of age: United States, United Arab Republic (Egypt), and India	49
22.	Comparison of selected percentiles of height and weight distributions of children aged 6 through 11 years, by single year of age and sex: United States, United Arab Republic (Egypt), and India	50
23.	Average heights of children aged 6 through 11 years at specified time periods, by sex and single year of age: United States, 1902, 1923, 1946, and 1963-65	51

Table 1. Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with number of children in the total U.S. population and actual number of children measured: United States, July 1963-December 1965

Age	Boys		Girls		Boys		Girls		Boys	Girls	Boys	Girls
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.				
	Height (cms.)				Weight (kgs.)				Population in thousands		Number [1] measured	
Total, 6-11 years-	...	...	...	...	...	...	...	...	12,081	11,703	3,632	3,487
6 years---------	118.6	5.3	117.8	5.5	22.0	3.5	21.6	3.7	2,082	2,016	575	536
7 years---------	124.5	5.4	123.5	5.9	24.7	4.1	24.2	4.2	2,074	2,010	632	609
8 years---------	130.0	5.7	129.4	6.2	27.8	4.9	27.6	5.5	2,026	1,960	618	613
9 years---------	135.5	6.7	135.5	6.9	31.2	6.8	31.4	6.8	2,012	1,945	603	581
10 years--------	140.2	6.8	140.9	7.3	33.7	6.6	35.2	8.1	1,963	1,904	576	584
11 years--------	145.7	7.0	147.6	7.8	38.4	8.4	40.0	9.3	1,924	1,868	628	564

[1] Same for both height and weight.

Table 2. Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965

Sex and height (cms.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 105.0	-	-	-	0.4	-	-
105.0-109.9	4.2	0.2	0.2	-	0.2	0.2
110.0-114.9	20.0	3.6	0.7	0.1	0.2	-
115.0-119.9	36.0	15.7	3.7	0.4	-	0.1
120.0-124.9	28.2	34.5	11.4	4.6	0.7	-
125.0-129.9	9.6	29.2	33.8	13.2	5.5	.9
130.0-134.9	1.9	12.8	31.8	26.3	14.7	4.2
135.0-139.9	0.2	3.7	15.1	29.1	24.6	13.4
140.0-144.9	-	0.4	2.9	20.3	30.6	25.2
145.0-149.9	-	-	0.3	4.1	17.0	29.1
150.0-154.9	-	-	0.1	1.0	5.2	18.5
155.0-159.9	-	-	-	0.5	1.3	7.2
160.0-164.9	-	-	-	-	-	0.8
165.0 or more	-	-	-	-	-	0.3
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 105.0	0.7	-	0.5	-	-	0.2
105.0-109.9	8.0	0.9	-	-	0.2	0.2
110.0-114.9	19.3	6.3	0.6	0.1	0.2	0.2
115.0-119.9	38.4	18.8	5.4	1.3	0.2	-
120.0-124.9	23.6	34.2	14.9	4.2	0.7	0.2
125.0-129.9	8.6	27.2	30.7	15.2	4.5	0.8
130.0-134.9	1.3	9.9	30.1	26.1	14.0	3.1
135.0-139.9	0.2	1.9	13.9	27.5	24.4	8.8
140.0-144.9	-	0.6	3.2	15.6	27.0	22.3
145.0-149.9	-	0.2	0.6	8.0	18.2	29.8
150.0-154.9	-	-	-	2.4	7.8	17.4
155.0-159.9	-	-	-	-	2.3	12.9
160.0-164.9	-	-	-	-	0.4	3.4
165.0 or more	-	-	-	-	-	1.0

Table 3. Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965

Sex and weight (kgs.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 15.0	-	-	-	-	-	-
15.0-19.9	27.0	7.7	2.2	0.4	-	-
20.0-24.9	58.6	52.0	28.5	12.5	3.3	0.7
25.0-29.9	12.4	31.9	45.8	39.6	26.4	9.1
30.0-34.9	1.4	6.5	16.6	28.3	35.1	28.8
35.0-39.9	0.3	1.1	4.5	10.9	21.5	30.4
40.0-44.9	0.1	0.1	1.2	4.0	8.7	12.8
45.0-49.9	0.2	0.6	0.9	2.2	2.2	9.6
50.0-54.9	-	-	0.4	0.4	1.4	5.1
55.0-59.9	-	-	-	1.0	0.8	1.5
60.0-64.9	-	-	-	0.4	0.4	0.9
65.0-69.9	-	-	-	0.3	0.2	0.7
70.0 or more	-	-	-	-	0.1	0.4
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 15.0	0.8	-	-	-	-	-
15.0-19.9	35.8	13.7	3.6	0.8	0.2	-
20.0-24.9	50.3	51.0	332.0	13.6	5.3	0.9
25.0-29.9	9.6	26.3	39.4	36.9	24.1	9.6
30.0-34.9	2.6	6.8	16.0	25.9	25.9	23.7
35.0-39.9	0.9	1.6	5.3	10.9	22.4	24.5
40.0-44.9	-	0.4	2.8	5.6	11.2	16.4
45.0-49.9	-	0.1	0.8	5.2	5.9	10.8
50.0-54.9	-	-	0.1	0.7	3.1	6.6
55.0-54.9	-	-	-	0.2	0.7	3.9
60.0-64.9	-	-	-	0.2	0.5	2.2
65.0-69.9	-	-	-	-	-	0.8
70.0 or more	-	-	-	-	0.6	0.5

Table 4. Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965

Sex and age	Percentile				
	10	25	50	75	90
	Height (cms.)				
Boys					
6 years	111.4	116.2	118.6	122.6	125.9
7 years	117.0	120.9	124.4	128 6	132.7
8 years	122.4	126.3	130.0	134.0	137.8
9 years	126.7	131.2	135.9	140.2	143.9
10 years	131.2	135.7	140.7	144.8	149.0
11 years	136.7	141.2	146.0	150.5	154.6
Girls					
6 years	110.4	114.2	117.9	121.8	125.1
7 years	115.7	119.7	123.5	127.7	131.3
8 years	121.2	125.6	129.7	133.8	137.8
9 years	126.4	130.8	135.5	140.1	144.9
10 years	131.5	136.1	141.1	146.0	150.4
11 years	138.1	142.6	147.4	152.8	157.9
	Weight (kgs.)				
Boys					
6 years	16.8	19.6	22.0	24.1	26.8
7 years	20.2	21.7	24.1	27.4	29.7
8 years	21.4	24.0	27.1	29.8	34.1
9 years	23.8	26.5	29.7	34.0	39.2
10 years	26.3	29.1	32.9	37.4	42.1
11 years	30.0	32.6	36.9	42.3	49.3
Girls					
6 years	16.3	18.4	21.3	23.8	26.6
7 years	18.7	21.1	23.6	27.0	29.8
8 years	21.0	23.3	26.8	30.0	34.7
9 years	23.4	26.4	29.8	34.6	41.7
10 years	25.9	29.1	33.9	39.3	45.7
11 years	29.7	33.0	38.2	45.0	53.1

Table 5. Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with actual number of children measured: India, 1956-65

Age	Boys		Girls		Boys		Girls		Boys	Girls
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
	Height (cms.)				Weight (kgs.)				Number measured[1]	
Total, 6-11 years	...	...	...	...	...	...	...	...	23,301	21,050
6 years	108.5	7.2	107.4	8.6	16.3	2.7	16.0	2.6	3,816	3,665
7 years	113.9	8.7	112.8	8.5	18.0	3.0	17.6	2.9	3,711	3,603
8 years	119.3	7.3	118.2	7.7	19.7	3.4	19.4	3.2	3,957	3,487
9 years	123.7	9.3	122.9	7.5	21.5	4.5	21.3	3.8	3,873	3,556
10 years	128.4	10.0	128.4	8.0	23.5	5.3	23.6	5.7	4,065	3,517
11 years	133.4	9.7	133.6	9.5	25.9	6.3	26.4	5.5	3,879	3,222

[1]Same for both height and weight.

Table 6. Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65

Sex and height (cms.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 90.0	-	-	-	-	-	-
90.0-94.9	1.3	0.1	0.2	-	-	-
95.0-99.9	6.0	0.9	0.3	-	-	-
100.0-104.9	21.3	5.8	1.2	0.2	0.2	-
105.0-109.9	31.6	18.8	5.3	1.2	0.5	0.0
110.0-114.9	23.8	30.7	18.0	6.6	1.9	0.3
115.0-119.9	10.6	25.6	29.4	18.7	6.2	2.0
120.0-124.9	3.7	12.8	25.8	30.6	19.6	8.6
125.0-129.9	1.2	3.8	13.2	24.1	29.4	20.0
130.0-134.9	0.4	1.0	4.9	12.7	23.9	28.7
135.0-139.9	0.0	0.3	1.3	4.0	12.3	22.2
140.0-144.9	-	0.1	0.3	1.8	4.3	10.8
145.0-149.9	-	0.0	0.0	0.4	1.4	4.5
150.0-154.9	-	-	0.0	0.1	0.2	1.9
155.0-159.9	-	-	-	0.1	0.0	0.6
160.0-164.9	-	-	-	0.0	0.0	0.2
165.0 or more	-	-	-	0.0	-	0.1
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 90.0	0.3	-	-	-	-	-
90.0-94.9	1.6	-	-	-	-	-
95.0-99.9	9.2	2.4	0.5	0.0	-	-
100.0-104.9	24.6	8.0	1.9	0.5	0.2	0.0
105.0-109.9	31.8	20.5	7.7	2.2	0.6	0.2
110.0-114.9	20.2	32.5	22.5	8.1	2.2	0.8
115.0-119.9	8.4	23.3	29.8	20.8	8.2	2.7
120.0-124.9	2.7	9.0	22.0	32.5	20.4	9.1
125.0-129.9	0.8	3.4	10.4	21.6	30.3	19.6
130.0-134.9	0.3	0.7	3.5	9.2	21.5	25.2
135.0-139.9	0.1	0.1	1.3	3.5	10.4	21.5
140.0-144.9	-	0.0	0.3	1.1	3.9	12.8
145.0-149.9	-	-	0.0	0.3	1.7	5.6
150.0-154.9	-	-	-	0.1	0.4	2.0
155.0-159.9	-	-	-	0.0	0.1	0.4
160.0-164.9	-	-	-	-	0.0	0.1
165.0 or more	-	-	-	-	-	-

Table 7. Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: India, 1956-65

Sex and weight (kgs.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10.0	0.1	-	-	-	-	-
10.0-14.9	26.4	8.8	2.4	0.5	0.3	-
15.0-19.9	65.2	69.0	51.3	31.0	13.4	4.7
20.0-24.9	7.8	20.6	40.9	54.8	54.0	40.0
25.0-29.9	0.4	1.6	5.0	11.7	27.2	39.6
30.0-34.9	-	-	0.3	1.6	4.4	11.2
35.0-39.9	-	-	-	0.4	0.6	3.4
40.0-44.9	-	-	-	0.0	0.0	0.7
45.0-49.9	-	-	-	-	-	0.2
50.0-54.9	-	-	-	-	-	0.1
55.0 or more	-	-	-	-	-	-
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10.0	0.2	-	-	-	-	-
10.0-14.9	34.6	13.9	3.9	1.3	0.3	0.3
15.0-19.9	58.9	68.3	56.2	34.2	15.8	6.1
20.0-24.9	5.7	16.6	35.1	51.5	53.1	36.4
25.0-29.9	0.6	1.2	4.5	10.7	24.4	36.8
30.0-34.9	0.0	0.1	0.3	1.7	4.8	13.4
35.0-39.9	-	-	-	0.5	1.1	5.2
40.0-44.9	-	-	-	0.1	0.4	1.2
45.0-49.9	-	-	-	0.0	0.1	0.5
50.0 or more	-	-	-	-	-	0.1

Table 8. Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: India, 1956-65

Sex and age	Percentile				
	10	25	50	75	90
	Height (cms.)				
Boys					
6 years	100.7	104.2	108.4	112.7	117.2
7 years	106.1	109.8	114.0	118.3	122.6
8 years	111.5	115.3	119.8	124.7	129.8
9 years	115.6	119.6	123.8	128.4	133.0
10 years	120.4	124.3	128.8	133.3	138.0
11 years	124.4	128.8	133.3	138.2	143.4
Girls					
6 years	99.5	103.2	107.2	111.6	115.9
7 years	104.8	108.8	113.0	117.1	121.4
8 years	109.9	113.5	117.8	122.6	127.1
9 years	114.1	118.3	122.5	126.9	131.5
10 years	119.5	123.6	128.1	132.6	137.7
11 years	123.8	128.2	133.4	138.8	144.0
	Weight (kgs.)				
Boys					
6 years	13.7	15.0	16.7	18.7	21.1
7 years	15.1	16.5	18.4	20.7	23.0
8 years	16.3	17.9	19.6	21.6	23.9
9 years	17.9	19.4	21.2	23.4	26.0
10 years	18.5	20.5	22.9	25.4	28.1
11 years	20.9	23.0	25.4	28.3	31.6
Girls					
6 years	12.9	14.1	15.8	17.3	19.0
7 years	13.8	15.7	17.3	19.2	21.0
8 years	15.9	17.4	19.2	21.1	23.4
9 years	17.3	19.0	21.0	23.1	25.7
10 years	19.0	20.9	23.2	25.6	28.6
11 years	20.7	23.0	25.7	29.5	32.9

Table 9. Means and standard deviations (S.D.) for height and weight of children aged 6 through 11 years, by sex and single year of age; with actual number of children measured: United Arab Republic (Egypt), 1962-63

Age	Boys		Girls		Boys		Girls		Boys	Girls
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.		
	Height (cms.)				Weight (kgs.)				Number[1] measured	
Total, 6-11 years	...	...	...	...	...	...	...	...	64,693	46,527
6 years	114.2	6.3	113.5	6.9	20.3	3.1	20.1	3.6	6,839	5,058
7 years	118.0	6.6	117.5	6.9	21.6	3.4	21.5	3.8	11,982	9,082
8 years	122.7	6.7	122.4	6.7	23.6	3.8	23.5	4.1	12,727	9,036
9 years	127.4	6.7	126.9	6.8	25.6	4.1	25.6	4.5	12,130	8,735
10 years	131.8	7.2	131.7	7.3	28.0	4.9	28.3	6.1	11,041	7,880
11 years	135.9	7.6	136.9	7.8	30.3	5.2	31.1	5.7	9,974	6,738

[1]Same for both height and weight.

Table 10. Percent distribution of grouped heights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63

Sex and height (cms.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 100.0	0.7	0.2	-	-	-	-
100.0-104.9	5.5	2.2	0.5	0.1	0.0	-
105.0-109.9	18.3	7.5	1.6	0.3	0.1	0.1
110.0-114.9	31.6	22.0	8.4	2.3	0.7	0.6
115.0-119.9	29.0	31.9	22.3	9.1	3.0	1.2
120.0-124.9	11.2	23.8	33.4	25.2	12.9	4.9
125.0-129.9	2.4	9.2	21.6	30.3	23.5	12.7
130.0-134.9	0.8	2.1	8.8	20.9	28.1	25.4
135.0-139.9	0.5	0.7	2.3	8.8	19.7	27.1
140.0-144.9	-	0.4	0.8	2.4	8.4	17.9
145.0-149.9	-	-	0.3	0.5	2.7	7.3
150.0-154.9	-	-	-	0.1	0.9	2.0
155.0-159.9	-	-	-	-	-	0.6
160.0-164.9	-	-	-	-	-	0.2
165.0 or more	-	-	-	-	-	-
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 100.0	1.0	0.3	-	-	-	-
100.0-104.9	7.6	2.3	0.5	0.1	0.1	-
105.0-109.9	20.4	8.4	1.8	0.4	0.0	-
110.0-114.9	33.7	25.5	9.5	2.5	0.7	0.2
115.0-119.9	24.2	32.0	23.8	10.1	3.5	0.7
120.0-124.9	9.1	20.5	32.7	26.4	12.9	4.6
125.0-129.9	1.9	7.5	20.8	29.8	23.9	12.4
130.0-134.9	0.6	2.0	8.0	20.6	28.9	24.3
135.0-139.9	1.0	1.0	1.8	6.9	17.8	25.1
140.0-144.9	0.5	0.5	0.6	2.2	8.1	18.5
145.0-149.9	-	-	0.5	0.6	2.8	9.2
150.0-154.9	-	-	-	0.3	1.2	3.6
155.0-159.9	-	-	-	-	-	1.1
160.0-164.9	-	-	-	-	-	0.2
165.0 or more	-	-	-	-	-	0.1

Table 11. Percent distribution of grouped weights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63

Sex and weight (kgs.)	Age in years					
	6	7	8	9	10	11
	Percent distribution					
Boys						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 14.0	0.8	0.4	0.1	0.1	0.0	0.0
14.0-17.9	17.5	9.2	3.0	0.8	0.3	0.1
18.0-21.9	58.5	50.0	30.8	15.3	7.0	3.2
22.0-25.9	20.1	32.7	45.4	42.9	29.4	15.7
26.0-29.9	2.5	5.8	15.5	27.8	32.8	29.4
30.0-33.9	0.4	1.4	4.0	10.4	21.4	32.5
34.0-37.9	0.3	0.5	0.7	1.8	6.3	12.5
38.0-41.9	-	-	0.2	0.5	1.6	4.4
42.0-45.9	-	-	0.2	0.4	0.6	1.2
46.0-49.9	-	-	-	-	0.2	0.4
50.0 or more	-	-	-	-	0.3	0.6
Girls						
Total	100.0	100.0	100.0	100.0	100.0	100.0
Less than 14.0	1.2	0.5	0.1	0.0	0.0	0.0
14.0-17.9	21.4	10.7	3.3	0.8	0.3	0.1
18.0-21.9	58.2	53.4	33.9	17.4	6.9	2.6
22.0-25.9	15.6	27.6	43.0	42.4	28.7	16.0
26.0-29.9	1.8	4.9	13.8	25.2	32.9	26.9
30.0-33.9	0.5	1.2	3.6	10.1	19.6	27.7
34.0-37.9	0.7	1.1	1.0	2.5	6.8	14.8
38.0-41.9	0.7	0.5	0.8	0.8	2.6	7.4
42.0-45.9	-	-	0.4	0.7	1.3	3.2
46.0-49.9	-	-	-	0.1	0.6	1.2
50.0 or more	-	-	-	-	0.3	-

Table 12. Selected percentiles of height and weight distributions of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63

Sex and age	Percentile				
	10	25	50	75	90
	Height (cms.)				
Boys					
6 years	106.0	110.1	114.0	118.3	122.2
7 years	110.0	113.4	117.8	122.4	126.3
8 years	114.7	118.2	122.6	127.0	131.2
9 years	119.1	122.6	127.2	131.3	136.1
10 years	122.4	126.8	131.7	136.7	141.2
11 years	126.3	131.1	135.9	140.8	145.1
Girls					
6 years	105.3	109.0	113.1	117.6	121.7
7 years	109.4	112.7	117.1	121.6	126.0
8 years	114.1	117.8	122.3	126.7	130.7
9 years	118.4	122.2	126.8	131.4	135.1
10 years	122.2	126.6	131.5	136.4	141.3
11 years	126.8	131.5	136.6	142.1	147.3
	Weight (kgs.)				
Boys					
6 years	16.1	18.5	20.2	21.9	24.6
7 years	18.0	19.2	21.2	23.9	25.7
8 years	18.9	20.8	23.4	25.6	28.8
9 years	20.4	22.8	25.2	28.3	31.2
10 years	22.4	24.1	27.6	31.0	33.9
11 years	23.7	26.8	30.2	33.9	36.9
Girls					
6 years	15.7	18.2	19.9	21.6	24.4
7 years	17.6	19.0	20.9	23.5	25.7
8 years	18.8	20.5	23.2	25.5	28.8
9 years	20.1	22.6	25.0	28.3	31.7
10 years	22.4	24.5	27.7	31.3	34.5
11 years	23.8	27.0	30.7	34.4	39.0

Table 13. Selected percentiles of weight distribution of boys aged 6 through 11 years at successive grouped height intervals, by single year of age: United States, July 1963-December 1965

Age and height (cms.)[1]	Mean weight	Percentile				
		10	25	50	75	90
		Weight (kgs.)				
6 years						
105.0-109.9	17.6	15.8	16.8	17.7	18.7	19.5
110.0-114.9	19.4	17.1	18.1	19.2	20.5	21.6
115.0-119.9	21.4	18.9	20.0	21.2	22.5	23.6
120.0-124.9	23.7	20.6	21.7	23.1	24.8	26.6
125.0-129.9	25.8	22.9	24.0	25.4	27.1	29.5
7 years						
110.0-114.9	19.6	17.3	18.6	19.5	20.9	22.1
115.0-119.9	21.3	18.9	20.0	21.1	22.5	23.8
120.0-124.9	23.4	20.8	22.0	23.2	24.7	26.2
125.0-129.9	26.1	22.8	24.2	25.7	27.5	29.6
130.0-134.9	28.8	23.9	25.8	27.6	29.9	31.8
135.0-139.9	30.2	26.5	28.5	29.9	32.3	33.1
8 years						
115.0-119.9	21.1	18.8	19.6	20.8	22.2	23.0
120.0-124.9	23.7	21.0	22.1	23.3	24.6	26.8
125.0-129.9	26.0	23.4	24.2	25.6	27.5	29.4
130.0-134.9	29.0	25.2	26.8	28.4	30.3	33.8
135.0-139.9	32.7	27.9	29.1	31.8	34.3	37.4
140.0-144.9	34.9	30.6	31.6	33.3	34.9	39.0
9 years						
120.0-124.9	23.2	20.6	22.1	23.4	24.7	25.9
125.0-129.9	26.1	22.7	23.9	25.5	27.7	30.0
130.0-134.9	28.4	25.0	26.3	28.0	29.7	32.3
135.0-139.9	31.7	27.2	28.8	30.9	33.8	37.7
140.0-144.9	36.3	30.0	31.9	34.4	37.7	43.3
145.0-149.9	39.3	30.6	32.4	36.4	46.8	49.4
10 years						
125.0-129.9	26.7	23.7	25.1	26.0	27.7	30.7
130.0-134.9	28.4	25.0	26.2	28.4	30.0	32.5
135.0-139.9	31.4	27.7	29.0	30.8	33.5	35.8
140.0-144.9	34.6	30.3	31.8	33.5	36.5	41.0
145.0-149.9	38.8	32.5	35.1	38.0	41.8	45.7
150.0-154.9	42.0	35.6	36.9	39.9	43.1	50.9
11 years						
130.0-134.9	29.8	26.0	27.9	29.6	32.1	33.6
135.0-139.9	32.0	28.4	29.3	31.3	34.3	36.3
140.0-144.9	35.2	30.5	32.2	34.2	37.3	41.1
145.0-149.9	39.2	33.4	34.9	37.6	41.2	47.8
150.0-154.9	42.4	36.2	37.9	41.2	45.8	50.8
155.0-159.9	42.9	39.7	42.8	47.8	54.5	65.1

[1]Data are for those height groups for which at least 15 persons were measured. For most of the groups the number measured was many times this minimum.

Table 14. Selected percentiles of weight distribution of girls aged 6 through 11 years at successive grouped height intervals, by single year of age: United States, July 1963-December 1965

Age and height (cms.)[1]	Mean weight	Percentile				
		10	25	50	75	90
		Weight (kgs.)				
6 years						
105.0-109.9	16.8	15.3	15.8	16.6	17.8	18.7
110.0-114.9	19.4	17.0	18.4	19.2	20.3	21.9
115.0-119.9	21.1	18.6	19.5	20.8	22.4	24.2
120.0-124.9	23.5	20.5	21.8	23.1	24.7	27.0
125.0-129.9	26.5	22.5	23.8	25.6	28.1	31.7
7 years						
110.0-114.9	19.2	17.3	18.4	19.2	20.0	21.5
115.0-119.9	21.1	18.7	19.6	20.9	22.3	23.5
120.0-124.9	23.6	20.4	21.7	23.1	24.8	27.7
125.0-129.9	26.3	22.9	23.8	25.8	28.6	31.3
130.0-134.9	28.0	24.2	25.4	26.7	29.7	33.4
8 years						
115.0-119.9	21.7	18.8	19.6	21.2	23.7	25.0
120.0-124.9	23.0	20.0	21.0	22.5	24.4	26.8
125.0-129.9	25.8	22.2	23.6	25.4	28.1	30.5
130.0-134.9	29.1	24.7	26.2	28.3	30.6	34.4
135.0-139.9	32.6	27.8	29.2	31.8	35.1	39.4
140.0-144.9	38.7	31.8	34.0	38.3	42.2	46.7
9 years						
120.0-124.9	23.7	20.7	22.2	23.2	25.3	27.0
125.0-129.9	26.1	22.8	24.1	25.7	28.0	29.8
130.0-134.9	28.4	24.6	26.0	27.8	30.2	33.2
135.0-139.9	32.4	27.8	29.2	31.1	35.0	38.5
140.0-144.9	37.1	30.5	32.3	34.7	40.3	45.0
145.0-149.9	39.8	29.9	33.3	40.0	46.5	49.9
10 years						
125.0-129.9	25.6	21.4	23.5	24.6	26.5	30.1
130.0-134.9	28.6	24.6	25.8	27.4	29.6	32.8
135.0-139.9	32.0	26.7	28.2	31.0	34.8	40.0
140.0-144.9	36.3	30.3	32.2	34.7	37.0	45.4
145.0-149.9	40.1	32.4	35.7	38.9	42.6	48.7
150.0-154.9	43.4	35.7	37.4	41.5	45.0	51.4
11 years						
130.0-134.9	29.7	26.6	27.3	28.5	31.5	33.3
135.0-139.9	32.4	27.4	29.2	32.3	35.2	39.6
140.0-144.9	34.9	29.4	31.4	34.4	37.5	40.0
145.0-149.9	39.2	32.3	34.5	38.2	42.9	47.9
150.0-154.9	44.0	34.8	38.0	42.8	48.2	54.6
155.0-159.9	49.4	40.3	42.9	49.3	55.3	61.8
160.0 or more	53.7	43.7	46.2	50.8	61.2	67.4

[1]Data are for those height groups for which at least 15 persons were measured. For most of the groups the number measured was many times this minimum.

Table 15. Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: United States, July 1963-December 1965

Sex and height (cms.)	Population in thousands	Number measured	Mean weight	Percentile				
				10	25	50	75	90
				Weight (kgs.)				
Boys								
Total	12,068	3,632	...	...	...	...	...	...
Less than 105.0	7	2	...	...	...	...	...	...
105.0-109.9	100	28	19.0	15.9	16.9	17.9	19.0	19.8
110.0-114.9	512	145	19.5	17.1	18.1	19.3	20.6	21.6
115.0-119.9	1,161	323	21.3	18.9	20.0	21.1	22.5	23.6
120.0-124.9	1,638	488	23.5	20.7	21.9	23.2	24.7	26.4
125.0-129.9	1,881	569	26.1	23.1	24.2	25.6	27.5	29.6
130.0-134.9	1,848	555	28.8	25.0	26.4	28.2	30.0	33.0
135.0-139.9	1,711	520	31.8	27.6	29.0	31.0	33.8	36.5
140.0-144.9	1,561	473	35.2	30.3	31.9	34.0	37.1	41.8
145.0-149.9	980	300	39.0	32.8	34.8	37.6	41.8	47.6
150.0-154.9	482	163	42.6	36.0	37.7	41.0	45.9	51.4
155.0-159.9	174	58	50.7	40.1	43.3	48.3	56.7	65.0
160.0 or more	20	8	...	...	...	...	...	...
Girls								
Total	11,696	3,487	...	...	...	...	...	...
Less than 105.0	30	7	...	...	...	...	...	...
105.0-109.9	185	49	17.4	15.3	15.9	16.8	18.0	19.5
110.0-114.9	539	153	19.6	17.1	18.4	19.3	20.4	22.1
115.0-119.9	1,288	359	21.1	18.7	19.6	20.8	22.4	24.1
120.0-124.9	1,552	452	23.5	20.3	21.7	23.0	24.8	27.4
125.0-129.9	1,717	518	26.1	22.2	23.8	25.6	28.1	30.8
130.0-134.9	1,647	512	28.7	24.6	26.0	27.9	30.2	33.8
135.0-139.9	1,477	450	32.3	27.3	28.9	31.3	35.0	39.4
140.0-144.9	1,309	400	36.1	30.1	32.1	34.7	38.9	44.7
145.0-149.9	1,062	314	39.5	32.0	34.9	38.5	43.1	48.3
150.0-154.9	519	161	43.8	35.1	37.8	42.6	47.1	53.9
155.0-159.9	284	83	49.4	40.2	43.4	49.3	54.9	60.0
160.0 or more	90	29	53.8	43.8	46.7	50.9	61.7	67.0

Table 16. Weight-height ratios at specified heights of children aged 6 through 11 years, by sex and single year of age: United States, July 1963-December 1965

(Ratios, expressed as grams per centimeter, are relations of mean weights for 5-centimeter height groups to midpoint of grouped heights. Data are for those height groups for which at least 15 persons were measured)

Midpoint of height group (cms.)	Total, 6-11 years	Age in years					
		6	7	8	9	10	11
	Ratio						
Boys							
Less than 105.0	*	*	*	*	*	*	*
107.5	164	*	*	*	*	*	177
112.5	172	174	*	*	*	*	173
117.5	181	181	179	*	*	*	181
122.5	193	191	193	189	*	*	192
127.5	202	205	204	205	210	*	205
132.5	*	218	219	214	215	225	217
137.5	*	219	238	230	228	233	231
142.5	*	*	245	255	243	247	247
147.5	*	*	*	267	263	266	265
152.5	*	*	*	*	276	278	279
157.5	*	*	*	*	*	317	322
160.0 or more	*	*	*	*	*	*	*
Girls							
Less than 105.0	*	*	*	*	*	*	*
107.5	156	*	*	*	*	*	162
112.5	172	171	*	*	*	*	174
117.5	179	179	185	176	*	*	180
122.5	192	192	188	193	*	*	192
127.5	208	206	202	204	200	*	204
132.5	*	211	219	214	216	224	217
137.5	*	*	237	236	232	236	235
142.5	*	*	272	260	255	245	254
147.5	*	*	*	270	272	266	268
152.5	*	*	*	*	285	289	287
157.5	*	*	*	*	*	313	313
160.0 or more	*	*	*	*	*	[1]330	[1]330

[1]Ratios calculated by arbitrarily using 163 cms. as "midpoint" value.

Table 17. Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: India, 1956-65

Height (cms.)	Number measured	Mean weight	Percentile				
			10	25	50	75	90
			Weight (kgs.)				
Boys							
Less than 105.0	1,327	14.2	12.3	13.2	13.9	14.9	15.7
105.0-109.9	2,040	15.8	14.0	14.7	15.5	16.3	17.2
110.0-114.9	2,902	17.3	15.3	16.1	17.0	17.7	18.9
115.0-119.9	3,349	19.0	16.8	17.7	18.6	19.8	20.9
120.0-124.9	3,711	31.0	18.4	19.5	20.6	22.0	23.3
125.0-129.9	3,400	23.3	20.4	21.5	22.8	24.4	26.0
130.0-134.9	2,645	25.5	22.4	23.5	25.1	26.9	28.7
135.0-139.9	1,478	27.9	24.1	25.7	27.6	29.5	31.4
140.0-144.9	619	30.5	26.4	27.7	30.0	32.3	35.4
145.0-149.9	232	33.6	28.0	31.1	33.1	36.4	38.7
150.0-154.9	81	37.3	28.3	32.6	36.9	41.4	42.6
155.0-159.9	25	41.5	*	*	*	*	*
160.0-164.9	8	44.6	*	*	*	*	*
165.0 or more	*	*	*	*	*	*	*
Girls							
Less than 105.0	1,238	14.0	12.0	12.8	13.7	14.7	15.6
105.0-109.9	2,199	15.7	13.8	14.5	15.4	16.3	17.2
110.0-114.9	3,005	17.2	15.2	16.0	16.9	17.9	18.9
115.0-119.9	3,236	18.8	16.6	17.5	18.5	19.6	20.7
120.0-124.9	3,314	20.8	18.3	19.7	20.4	21.7	22.9
125.0-129.9	2,960	22.7	20.0	21.0	22.4	23.7	25.7
130.0-134.9	2,043	25.0	22.0	23.1	24.6	26.2	28.0
135.0-139.9	1,231	27.4	24.0	25.3	27.0	28.9	30.9
140.0-144.9	596	30.4	26.3	27.7	29.7	32.2	35.3
145.0-149.9	250	34.5	29.0	31.2	33.6	37.7	40.5
150.0-154.9	83	36.2	30.4	32.5	36.8	38.6	41.3
155.0-159.9	15	36.2	*	*	*	*	*
160.0-164.9	3	44.9	*	*	*	*	*
165.0 or more	*	*	*	*	*	*	*

Table 18. Selected percentiles of weight distribution of children aged 6 through 11 years at successive grouped height intervals, by sex: United Arab Republic (Egypt), 1962-63

Sex and height (cms.)	Mean weight	Percentile				
		10	25	50	75	90
		Weight (kgs.)				
Boys						
Less than 100.0	---	14.2	15.3	17.2	19.7	21.3
100.0-104.9	---	14.5	15.6	17.8	20.2	21.6
105.0-109.9	18.7	14.9	16.5	18.8	20.6	21.7
110.0-114.9	20.0	16.6	18.6	20.0	21.4	23.5
115.0-119.9	21.5	18.3	19.4	21.1	23.4	25.2
120.0-124.9	23.6	19.3	21.5	23.5	25.2	27.1
125.0-129.9	26.0	22.1	23.3	25.2	27.7	29.5
130.0-134.9	28.7	23.4	26.0	28.1	30.3	33.0
135.0-139.9	31.4	26.4	28.4	31.0	33.2	35.9
140.0-144.9	34.2	29.2	31.2	33.5	36.5	39.4
145.0-149.9	36.7	31.3	34.1	36.8	40.1	43.6
150.0-154.9	39.6	35.0	38.1	41.0	44.7	49.3
155.0-159.9	46.4	39.1	42.3	45.6	50.4	54.4
160.0 or more	---	43.6	47.5	51.8	55.8	59.7
Girls						
Less than 100.0	---	14.2	15.3	17.0	19.3	21.1
100.0-104.9	---	14.4	15.5	17.4	19.8	21.4
105.0-109.9	18.2	14.9	16.4	18.7	20.5	21.7
110.0-114.9	19.5	16.5	18.5	19.9	21.3	22.8
115.0-119.9	21.0	18.3	19.3	20.9	23.0	25.1
120.0-124.9	23.1	19.3	21.4	23.4	25.2	27.2
125.0-129.9	25.4	22.1	23.3	25.2	27.8	29.8
130.0-134.9	28.0	23.4	25.3	27.9	29.4	33.3
135.0-139.9	31.0	26.3	28.3	31.1	33.7	37.0
140.0-144.9	34.3	29.4	31.6	34.7	38.1	42.8
145.0-149.9	37.3	32.7	36.2	40.7	45.8	52.2
150.0-154.9	41.6	38.2	41.5	45.8	50.0	53.0
155.0-159.9	47.5	42.6	46.8	52.2	57.0	60.9
160.0 or more	---	46.0	50.5	55.0	59.4	62.6

Table 19. Weight-height ratios at specified heights of children aged 6 through 11 years, by sex and single year of age: United Arab Republic (Egypt), 1962-63

(Ratios, expressed as grams per centimeter, are relations of mean weights for 5-centimeter height groups to midpoint of grouped heights)

Midpoint of height group (cms.)	Total, 6-11 years	Age in years					
		6	7	8	9	10	11
	Ratio						
Boys							
Less than 97.5	*	*	*	*	*	*	*
102.5	*	*	*	*	*	*	*
107.5	172	172	178	*	*	*	174
112.5	176	177	180	187	*	204	118
117.5	179	181	183	187	190	209	183
122.5	187	186	190	193	196	215	193
127.5	191	195	198	199	202	224	204
132.5	195	206	208	209	213	234	217
137.5	*	212	224	218	222	243	228
142.5	*	225	224	228	237	244	240
147.5	*	*	233	237	241	266	249
152.5	*	*	*	252	255	268	260
157.5	*	*	*	*	*	295	295
162.5 or more	*	*	*	*	*	*	*
Girls							
Less than 97.5	*	*	*	*	*	*	*
102.5	169	*	*	*	*	*	*
107.5	170	173	*	*	*	*	169
112.5	175	176	179	182	*	*	173
117.5	177	179	182	186	190	*	179
122.5	184	188	190	192	198	200	189
127.5	193	195	198	201	204	204	199
132.5	197	201	209	212	214	217	211
137.5	*	217	218	224	224	228	225
142.5	*	*	228	235	240	242	241
147.5	*	*	*	243	249	255	253
152.5	*	*	*	259	276	273	273
157.5	*	*	*	*	301	302	302
162.5 or more	*	*	*	*	*	*	*

Table 20. Comparison of weight-height ratios at specified heights of children aged 6 through 11 years, by sex: United States, United Arab Republic (Egypt), and India

(Ratios, expressed as grams per centimeter, are relations of mean weights for 5-centimeter height groups to midpoint of grouped heights)

Midpoint of height group (cms.)	Boys			Girls		
	United States	Egypt	India	United States	Egypt	India
	Ratio					
107.5	177	174	147	162	169	146
112.5	173	178	154	174	173	153
117.5	181	183	162	180	179	160
122.5	192	193	171	192	189	170
127.5	205	204	182	204	199	178
132.5	217	217	193	217	211	188
137.5	231	228	203	235	225	199
142.5	247	240	214	254	241	213
147.5	265	249	228	268	253	234
152.5	279	260	244	287	273	237
157.5	322	295	*	313	302	*

Table 21. Comparison of means for height and weight of children aged 6 through 11 years, by sex and single year of age: United States, United Arab Republic (Egypt), and India

Age	Boys			Girls		
	United States	Egypt	India	United States	Egypt	India
	Height (cms.)					
6 years	118.6	114.2	108.5	117.8	113.5	107.4
7 years	124.5	118.0	113.9	123.5	117.5	112.8
8 years	130.0	122.7	119.3	129.4	122.4	118.2
9 years	135.5	127.4	123.7	135.5	126.9	122.9
10 years	140.2	131.8	128.4	140.9	131.7	128.4
11 years	145.7	135.9	133.4	147.6	136.9	133.6
	Weight (kgs.)					
6 years	22.0	20.3	16.3	21.6	20.1	16.0
7 years	24.7	21.6	18.0	24.2	21.5	17.6
8 years	27.8	23.6	19.7	27.6	23.5	19.4
9 years	31.2	25.6	21.5	31.4	25.6	21.3
10 years	33.7	28.0	23.5	35.2	28.3	23.6
11 years	38.4	30.3	25.9	40.0	31.1	26.4

Table 22. Comparison of selected percentiles of height and weight distributions of children aged 6 through 11 years, by single year of age and sex: United States, United Arab Republic (Egypt), and India

Age and selected percentile	Boys			Girls		
	United States	Egypt	India	United States	Egypt	India
	Height (cms.)					
6 years						
25	116.2	110.1	104.2	114.2	109.0	103.1
50	118.6	114.0	108.4	117.9	113.1	107.2
75	122.6	118.3	112.7	121.8	117.6	111.6
7 years						
25	120.9	113.4	109.8	119.7	112.7	108.8
50	124.4	117.8	114.0	123.5	117.1	113.0
75	128.6	122.4	118.3	127.7	121.6	117.1
8 years						
25	126.3	118.2	115.3	125.6	117.8	113.5
50	130.0	122.6	119.8	129.7	122.3	117.8
75	134.0	127.0	124.7	133.8	126.7	122.6
9 years						
25	131.2	122.6	119.6	130.8	122.2	118.3
50	135.9	127.2	123.8	135.5	126.8	122.5
75	140.2	131.3	128.4	140.1	131.4	126.9
10 years						
25	135.7	126.8	124.3	136.1	126.6	123.6
50	140.7	131.7	128.9	141.1	131.5	128.1
75	144.8	136.7	133.3	146.0	136.4	132.6
11 years						
25	141.2	131.1	128.7	142.6	131.5	128.2
50	146.0	135.9	133.3	147.4	136.6	133.4
75	150.5	140.8	138.2	152.8	142.1	138.8
	Weight (kgs.)					
6 years						
25	19.6	18.5	15.0	18.4	18.2	14.1
50	22.0	20.2	16.7	21.3	19.9	15.7
75	24.1	21.9	18.7	23.8	21.6	17.3
7 years						
25	21.7	19.2	16.5	21.1	29.0	15.7
50	24.1	21.2	18.4	23.6	20.9	17.3
75	27.4	23.9	20.7	27.0	23.5	19.2
8 years						
25	24.0	20.8	17.9	23.3	20.5	17.4
50	27.1	23.4	19.6	26.8	23.2	19.2
75	29.8	25.6	21.6	30.0	25.5	21.1
9 years						
25	26.5	22.8	19.4	26.4	22.6	19.0
50	29.7	25.2	21.2	29.8	25.0	21.0
75	34.0	28.3	23.4	34.6	28.3	23.1
10 years						
25	29.1	24.1	20.5	29.1	24.5	20.9
50	32.9	27.6	22.9	33.9	27.7	23.2
75	37.4	31.0	25.4	39.3	31.3	25.6
11 years						
25	32.6	26.8	23.0	33.0	27.0	23.0
50	36.9	30.2	25.4	38.2	30.7	25.7
75	42.3	33.9	28.3	45.0	34.4	29.5

Table 23. Average[1] heights of children aged 6 through 11 years at specified time periods, by sex and single year of age: United States, 1902, 1923, 1946, and 1963-65

Age	Boys				Girls			
	Hastings 1902	Baldwin-Wood 1923	Stuart-Meredith 1946	HES 1963-65	Hastings 1902	Baldwin-Wood 1923	Stuart-Meredith 1946	HES 1963-65
	Height (cms.)							
6 years	110.7	116.8	117.5	118.6	109.9	114.3	115.9	117.8
7 years	115.7	121.9	124.1	124.5	115.0	119.4	122.3	123.5
8 years	121.3	127.0	130.0	130.0	120.2	127.0	128.0	129.4
9 years	125.9	132.1	135.5	135.5	126.2	132.1	132.9	135.5
10 years	131.0	137.2	140.3	140.2	131.3	137.2	138.6	140.9
11 years	134.9	142.2	144.2	145.7	135.2	142.2	144.7	147.6

[1]Data are means for all years except 1946, for which they are medians. Means and medians for HES 1963-65 data differ by less than 0.5 cms., or by less than 0.5 percent.

NOTE: Hastings' data are for children of Nebraska; Baldwin-Wood data are for children of the North Central and Northeastern States; Stuart-Meredith data are for children of Iowa; and HES data are for a probability sample of all children of the United States.

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